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STOPPING WATER POLLUTION AT ITS SOURCE

MISA

Municipal/Industrial Strategy for Abatement

TWELVE-MONTH MONITORING DATA

REPORT - METAL CASTING SECTOR

Ontario

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MISA TWELVE-MONTH MONITORING DATA REPORT

METAL CASTING SECTOR

(Period covered: May 1, 1990 to April 30, 1991)

SEPTEMBER 1993

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EXECUTIVE SUMMARY

As part of the Ministry of the Environment's Municipal/Industrial Strategy for Abatement (MISA) program, ten Metal Casting Sector plants were required under Ontario Regulation 648/89, to monitor their effluent streams for a twelve-month period. This document presents the results of monitoring from May 01,1990 to April 30, 1991.

Under the Regulation, a total of 161 Conventional and Priority Pollutants were specified to be monitored. Of this total, 63 parameters were "found"[1] in this Sector's final discharge streams. Parameters commonly found in the Sector effluent streams were: dissolved organic carbon (DOC), total suspended solids (TSS), aluminum, zinc, phenolics, iron, magnesium and fluoride.

The highest Long Term Average (LTA) concentrations of DOC, TSS, aluminum and zinc were found in the Canada Pipe's plant effluent. Since the end of monitoring, Canada Pipe has managed to recycle its wastewater and is no longer a direct discharger.

Elevated concentrations of phenolics (0.2 mg/L) were found in the Ford Motor Company's final effluent. The Ford Motor plant is presently looking at upgrading its wastewater treatment facility to improve upon phenolics removal.

In addition to elevated concentrations of aluminum and zinc, Haley Industries' final effluent was found to contain the highest concentrations of iron, magnesium and fluoride, compared to the other plants. The Haley Industries plant is presently upgrading its treatment facility. This is expected to make measurable improvements with respect to the number and concentrations of contaminants discharged to the environment.

The presence of TSS at the LTA concentration of 25.7 mg/L in Kubota's cooling water was due to algae growth in the cooling pond.

Traces of phenolics and aluminum were found in cooling water from the Western Foundry, Chrysler and Kubota plants. Phenolics were suspected to be coming from contaminated roof drains. Aluminum is the metal used in most plants as a raw material for various alloys and may enter the effluent stream via the yard drainage system.

The most toxic dioxin isomer 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8 TCDD), was not detected in this sector's wastewaters. Other congeners of dioxin and furan such as octachlorodibenzo-p-dioxin (O8CDD), penta- and tetrachlorodibenzofurans (PCDF and TCDF) were detected in the final effluents, at two plants (Ford and Haley) at or above the Regulation Method Detection Limit (RMDL) concentrations.

Octachlorodibenzofuran (O8CDF) was detected in Ford's final effluent at the RMDL concentrations. Total hexachlorodibenzo-p-dioxins and heptachlorodibenzofurans (H6CDD and H7CDF) were detected at Haley at the RMDL concentrations. Also detected at Haley were hexachlorodibenzofurans (H6CDF) at a concentration twice the RMDL, and heptachlorodibenzo-p-dioxins (H7CDD) at 2.6 times the RMDL. These results on dioxins and furans were based on two samples collected during the monitoring period. Since the monitoring was completed, Haley's final effluent has been sampled again by MOE staff. Only the O8CDD isomer was detected and its concentrations were below the RMDL.

There are no known sources of dioxins and furans at these industries. Further sampling will be conducted by the MOE to ascertain the absence of dioxin and furan compounds.

Of the twenty-one parameters listed on the Primary List and the forty-six on the Secondary List of the Ministry's Candidate Substances for Bans or Phase-Outs[2], nineteen were found in the final effluent streams of this Sector. Parameters recorded in the highest concentration range were arsenic, silver and copper, which were found at Haley Industries, and aluminum, cadmium, lead and zinc, found at Canada Pipe.

Of the total 116 samples tested for Rainbow trout, 33% were non-lethal, 27% had LC50>100% effluent and 40% were lethal. Samples tested for Daphnia magna were 35% non-lethal, 24% had LC50>100% effluent and 41% were lethal.

INTRODUCTION

The Municipal/Industrial Strategy for Abatement (MISA) Program is a regulatory program of the Ministry of the Environment (MOE) designed to reduce water pollution in Ontario. It was initiated in 1986. The ultimate goal of virtual elimination of persistent toxic contaminants from industrial and municipal dischargers into Ontario's waterways will be achieved in two phases:

- Under the first phase, the Effluent Monitoring Regulation was promulgated for the Metal Casting Sector. Under this regulation, the sector was required to monitor effluent for one year in order to establish a comprehensive database of contaminants discharged by this sector in Ontario.

- Under the second phase, the Effluent Limit Regulation will be developed using the information collected during one year of monitoring together with information obtained on Best Available Technology. The Best Available Technology (BAT) study for this sector was carried out for the Ministry by Beak Consultants Ltd.

This report summarizes the Metal Casting Sector Effluent monitoring data covering the period from May 01, 1990 to April 30, 1991. Background information about the monitoring regulation and the Sector is presented in the first two Sections. The effluent monitoring requirements are explained in Section 3.0. Section 4.0 deals with the treatment of monitoring data. Discussion of the results as well as comparisons to provincial requirements are presented in Sections 5.0 and 6.0, respectively.

1.0 BACKGROUND

The Metal Casting Sector Effluent Monitoring Regulation was promulgated on October 30, 1989 as O. Reg. 648/89. The Regulation was amended in May 1990 (filed as O.Reg. 232/90) and in August 1990 (filed as O.Reg. 419/90), to explain some monitoring requirements specific for this Sector.

Initially, when the Development Document for the Effluent Monitoring Regulation was written, there were thirteen companies on the list of direct dischargers in the Metal Casting Sector in Ontario. They were:

Bowmanville Foundry, Bowmanville
Canada Alloy Castings Ltd., Kitchener
Canada Pipe Company Ltd., Hamilton
Chrysler Canada Ltd.(formerly Acustar), Etobicoke
Crowe Foundry Limited, Cambridge
Fahramet (formerly Indusmin), Orillia
Ford Motor Company of Canada, Windsor
Franklin Electric of Canada Ltd., Strathroy
General Motors of Canada Ltd., St.Catharines
Haley Industries Ltd., Haley
Magalloy Ltd., Stratford
Richmond Die Casters Ltd., Cornwall
Western Foundry Company Limited, Wingham

Three companies (Bowmanville, Crowe and Magalloy) became indirect dischargers and as such they were not covered by this regulation. The Sector consisted of ten companies on May 1, 1990, when the monitoring started.

At the end of the twelve-month intensive monitoring period, four companies (Canada Pipe, Ford, General Motors and Haley) were selected to continue with the Extended Weekly Monitoring for another year since they are discharging treated process water. The extended weekly monitoring meant that all the parameters monitored previously at daily, thrice-weekly and weekly frequency were to be monitored at the weekly frequency. After March 1991, when modifications of the plant operation to eliminate direct discharges at Canada Pipe were completed, the company's name was taken off the direct dischargers list. Therefore, Canada Pipe was excluded from further monitoring. The other plants that discharge only cooling water were not required to monitor beyond the regulatory monitoring period.

2.0 SECTOR OVERVIEW

The Metal Casting Sector in Ontario consists of ten companies. There are six foundries, three die casters and Haley Industries who have both metal melting and die casting operations. The companies, the number of people they employed, production in tonnes of metal poured per day, the main raw material used in production and their major products at the time of monitoring, are listed in Table 1. An overview of each of the Metal Casting companies is provided in this Section.

2.1 CANADA ALLOY CASTINGS LTD., Kitchener

Canada Alloy Castings is located in south Kitchener at the intersection of Homer Watson Boulevard and Manitou Drive. The plant produces carbon and stainless steel castings for a variety of industries, including pulp and paper, hydro electric, nuclear and the military. The company's production capacity during the effluent monitoring year was 57.0 metric tons of steel per day.

The company uses city water (Figure 1) for sanitary facilities, cooling and quenching processes. The sanitary sewers receive casting quench water as well as the water from sanitary uses. Cooling water is used for cooling melting furnaces and air compressors. Air compressor cooling water is once through, however, some of it is diverted to the furnace cooling water system as makeup water. The furnaces' cooling water system is a double-closed loop system utilizing a heat exchanger and cooling tower, with no discharge and no blowdown. Once through cooling water is occasionally used on one or more of the melting furnaces, instead of the closed loop system.

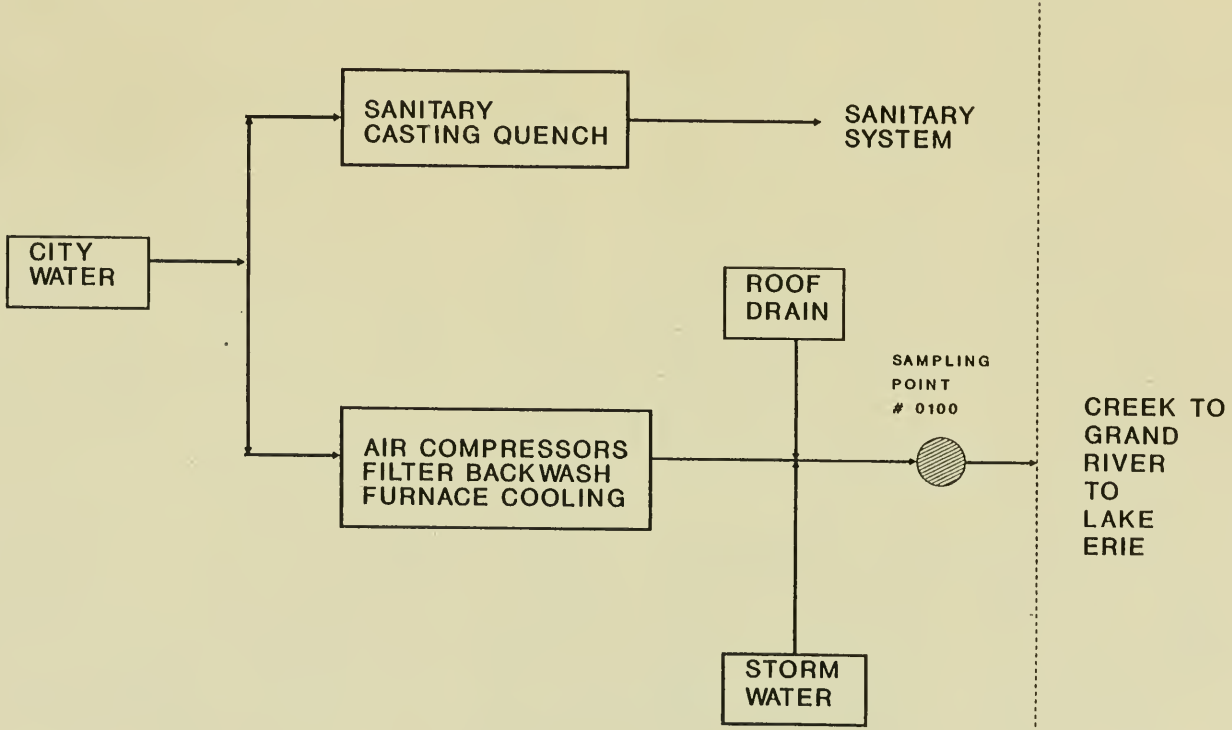
The storm sewer receives roof and property storm water, air compressor cooling water, the occasional once-through cooling water from the furnaces, and blowdown from sand filters on the close loop furnace cooling water system. The storm sewer discharges into a nearby creek, which flows into the Grand River.

During the effluent monitoring period, Canada Alloy Castings sampled one control point at the cooling water discharge into the storm sewer. This was cooling water effluent stream # 0100 and had an average estimated flow rate of 187 cubic meters per day during the monitoring period.

TABLE 1 - SECTOR OVERVIEW

COMPANY	NUMBER OF EMPLOYEES	PRODUCT (t/d)	METAL PRODUCED	MAJOR PRODUCTS
FOUNDRIES				
Canada Alloy Casting Ltd.	110	57	stainless steel	casting of industrial equipment
Canada Pipe Company Ltd.	270	285	nodular iron	pipes
Ford Motor Company of Canada Ltd.	1000	650	nodular and grey iron	automotive parts
General Motors of Canada Ltd.	4650	1510	nodular and grey iron	automotive parts
Haley Industries Ltd	413	2.7	aluminum magnesium	aerospace industry castings
Kubota Metal, Fahramet Division	240	28	stainless steel	industrial equipment parts
Western Foundry Company Ltd.	300	269	grey iron	automotive parts
DIE CASTERS				
Chrysler Canada Ltd.	450	68	aluminum	automotive parts
Franklin Electric of Canada	200	0.4	aluminum	electrical equipment
Richmond Die Casting Ltd.	125	11.3	aluminum	automotive parts

Figure 1. EFFLUENT FLOW SCHEMATIC - CANADA ALLOY CASTING LTD



2.2 CANADA PIPE COMPANY LTD., Hamilton

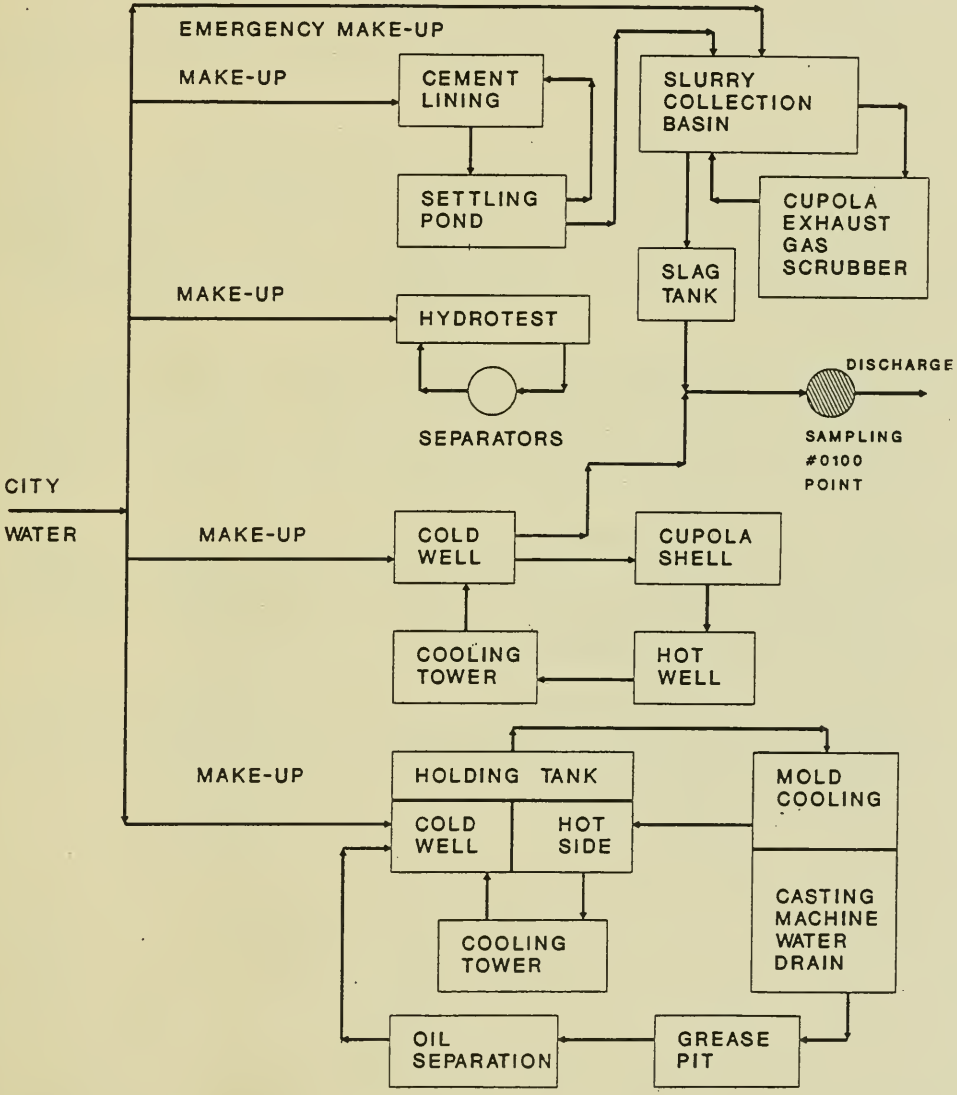
Canada Pipe is located on Burlington Street, Hamilton, Ontario. Canada Pipe is a producer of centrifugal spun iron pipe used for transportation of underground potable city water. Canada Pipe receives scrap metal which is melted in a cupola to produce molten iron from which pipes are made. All pipes produced are internally cement lined. The company's production (melting) capacity during the year of effluent monitoring was 285 tonnes per day.

Canada Pipe receives its water from the city of Hamilton (Figure 2). This water is used in the process for the cupola wet scrubber, and for hydrotesting and cupola cooling. During the monitoring period, excess process water included cement lining overflow water and spilled casting machine water. This water flow is directed to a 6000 gallon settling tank. Its primary purpose is to act as a settling basin for the recirculated water used in the cupola wet scrubber. To promote settling, caustic soda and polymers are fed into the system. Any net gain of plant wastewater is directed from this settling basin through one monitoring station and discharged into the storm sewer. Discharge quantities averaged 115.3 cubic meters per day.

Cooling towers are used on casting machine cooling water and cupola cooling water systems.

During the monitoring period the company was working towards zero discharge (recirculation) and is now no longer a direct discharger.

Figure 2. EFFLUENT FLOW SCHEMATIC
CANADA PIPE COMPANY LTD.



2.3 CHRYSLER CANADA LTD.,
Etobicoke Castings Division,
Etobicoke, Ontario

The Etobicoke Casting Company produces aluminum automotive castings such as pistons, master brake cylinders and various engine and transmission system components. The facility is located in Etobicoke, on the east side of Browns Line, directly north of the CN tracks. The company's production capacity during the year of effluent monitoring was 68 tonnes of aluminum per day.

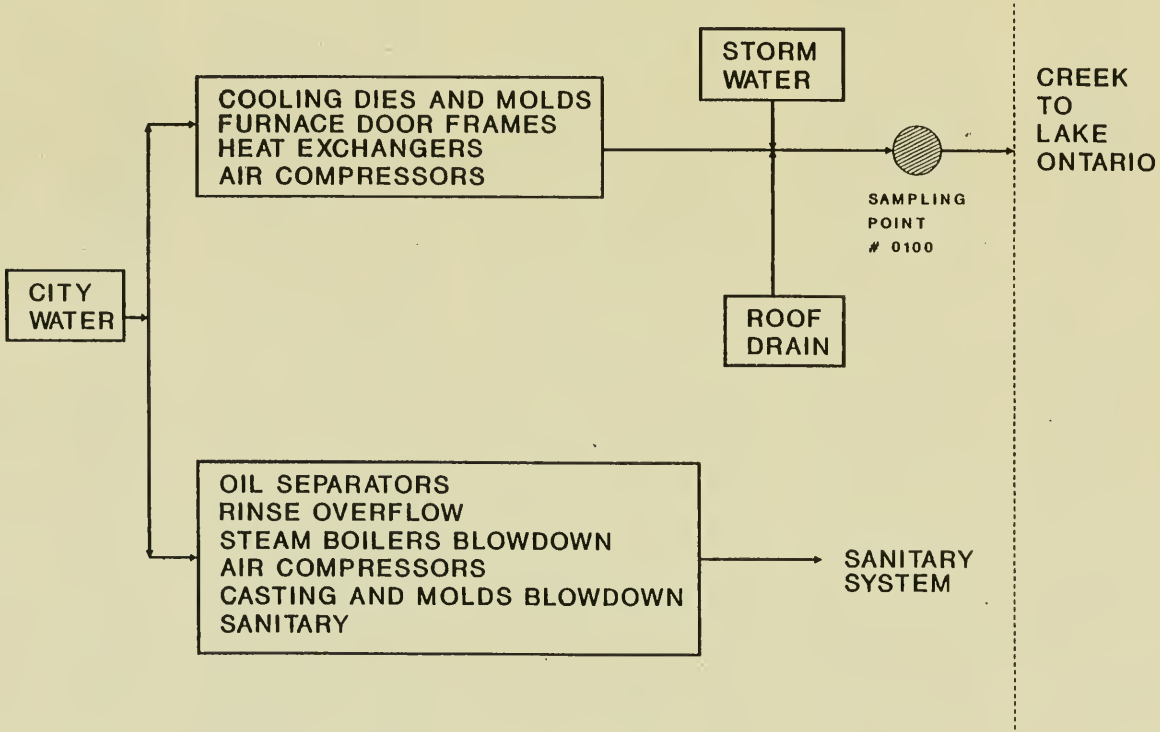
The company receives city water (Figure 3) and uses it for sanitary facilities and as cooling and process water. Cooling water is used for cooling furnace door frames, hydraulic oil heat exchangers, dies, molds, air compressors and the associated after-coolers used in the compressed air system. Cooling water is also used to quench-cool master brake castings. Water temperature is controlled using a cooling tower, or by direct city water addition.

The Lakeview Sewage Treatment plant in Mississauga receives waste water from several sources which include an oil separator, overflow from an impregnation rinse process, blowdown from any or all of three steam boilers, air compressor cooling water and blowdown from the cooling (permanent-mold millwater) system which cools molds and master brake cylinder castings.

The storm sewer receives overflow from a 2,200 gallon capacity tank, which is part of the (diecast millwater) system necessary for cooling dies, furnace door frames and hydraulic oil heat exchangers. Cooling water which cools two of the air compressors is also directed to the storm sewer. This discharges into a nearby creek, which goes into Lake Ontario.

During the year of monitoring, the Etobicoke Casting Plant was sampling only one control point, their storm sewer #0100 - classified as a cooling water effluent stream. The average flow recorded at this point was 1484 cubic meters per day.

Figure 3. EFFLUENT FLOW SCHEMATIC - CHRYSLER CANADA LTD.



2.4 FORD MOTOR COMPANY OF CANADA, LTD.
Windsor Casting Plant,
Windsor, Ontario

The Windsor complex of Ford Motor of Canada consists of two major facilities, a Casting Plant and an Engine Plant, with a powerhouse which supplies utilities to the complex. The company's production (melting) capacity during the year of effluent monitoring was 650 tonnes per day.

The Casting Plant is located just southeast of the intersection of Wyandotte and Drouillard Road. It produces nodular iron crankshafts, grey iron engine blocks and heads. Water is pumped from an intake at the powerhouse on the Detroit River (Figure 4) to the complex for cooling and process use. Two wastewater treatment facilities are used. Engine plant wastewater is treated in an Oily Waste Treatment Plant and Casting Plant process water is sent to a Clarification Plant.

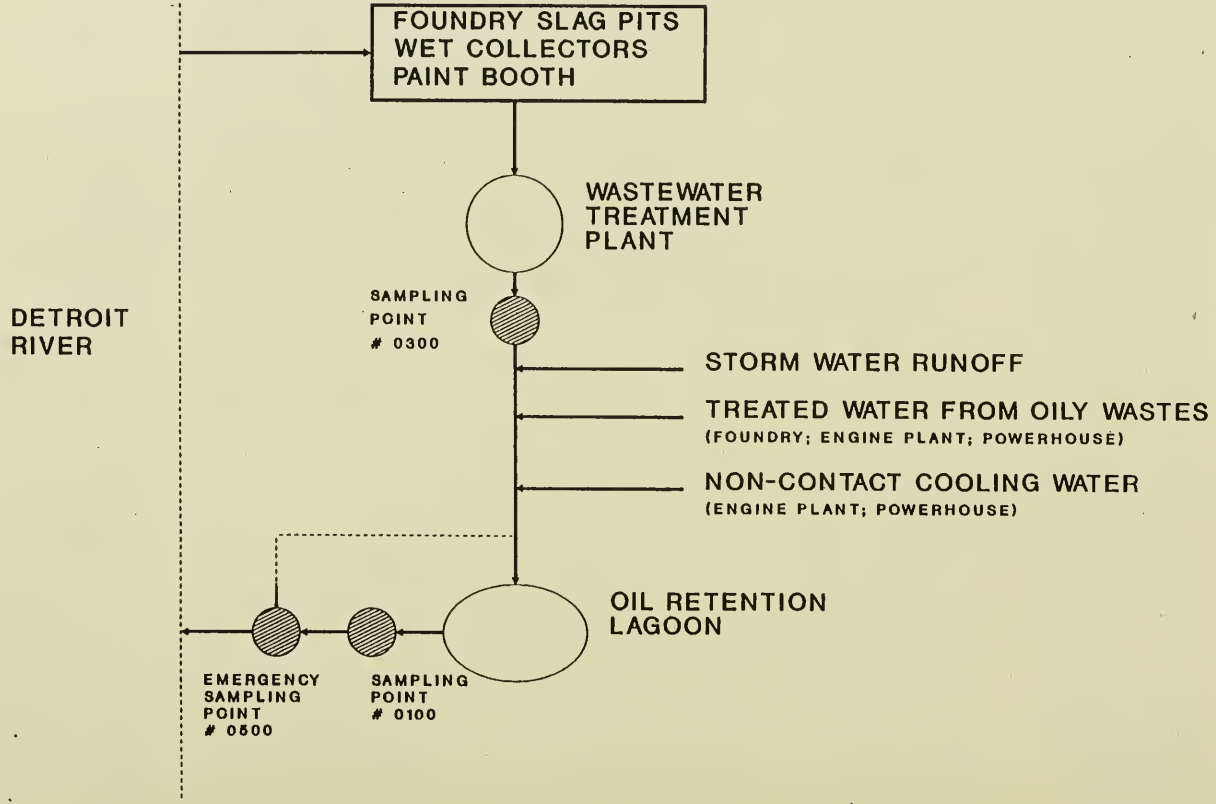
The Casting Plant process wastewater comes from the slagging operation of two cupolas and a number of dust collectors. The process water from the Casting Plant is treated with alum and polymer prior to entering two 33.5 m clarifiers. The solids in the process consist of primarily silica, slag, and iron which precipitates out of solution and collects at the bottom of the clarifiers. Solids from the clarifiers are pumped into one of the two adjacent settling lagoons. The treated water flows over a weir trough system and discharges into a combined sewer line. During the monitoring year, the casting plant discharged (control point #0300) an average of 29,760 cubic meters per day of treated process water from the Wastewater Treatment Plant.

The Oily Waste Treatment Facility is designed to treat coolant solutions with concentrated emulsified oil content and oily wastewater from industrial water overflows. The Oily Waste Treatment Plant processes on average, 756 cubic meters per day. There are three 909 cubic meter tanks used for batch treatment. Each batch is treated with sulphuric acid, calcium chloride and sodium hydroxide to break the emulsion and separate the wastewater into oil and water. These tanks are analyzed and discharged into the combined sewer, at an average rate of 3-5 batches per week. The concentrated oil is removed by a licensed oil reclamation company.

All non-contact cooling water, storm water, and treated process water discharge by gravity to the main sewer. The water is fed by gravity to two Archimedes screw pumps which lift the water to the polishing lagoon (oil retention lagoon).

The polishing lagoon provides settling capacity for suspended solids and enables the operators to contain the oil clean up and divert any oil that may by-pass the system (e.g. yard run-off). Discharge from the lagoon was sampled (control point #0100) during the monitoring year. The average flow rate recorded was 73,590 cubic meters per day.

Figure 4. EFFLUENT FLOW SCHEMATIC
FORD MOTOR COMPANY OF CANADA LTD.



2.5 FRANKLIN ELECTRIC OF CANADA LTD., Strathroy

Franklin Electric is located on the east side of highway 81, just south of highway 402, north of the town of Strathroy. Franklin's main products are motors for well water pumps including: housing, rotor, shaft, stator and the shell. Raw materials are: aluminum for motor housing cast and rotors, iron bars for shafts, copper and aluminum wiring, and steel for motor shells. At the time of monitoring the plant's average melting capacity was 0.4 tonnes per day.

All intake water for the plant is pumped from wells located on the property (Figure 5). This water is for cooling, sanitary and process use.

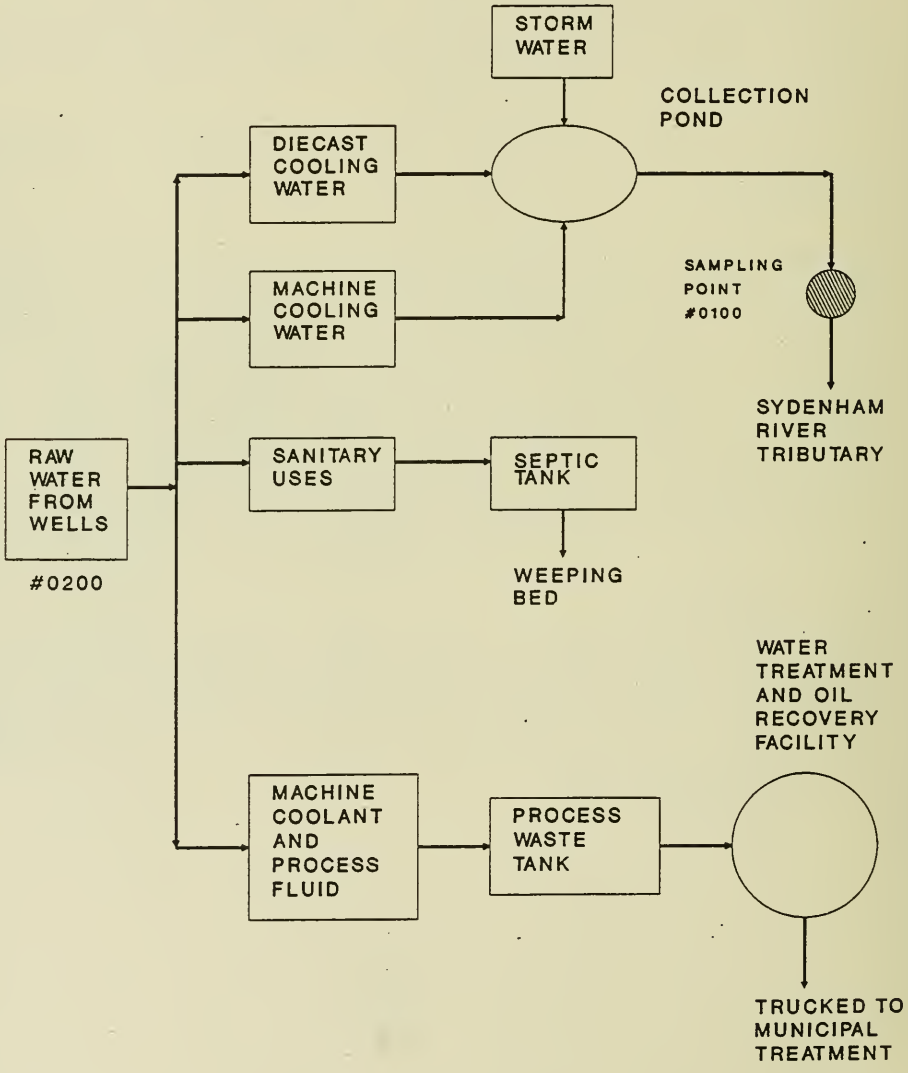
Franklin discharges cooling water from air compressors, die casting machines and hydraulic fluid cooling systems to the cooling pond. A quench tank overflow and phosphate rinse tank overflow are also discharged to the cooling pond. The amounts involved in the discharges are minor in comparison to the total cooling water component. Quench tank wastes generally contain elevated levels of metals and solids and may contain some organics. Phosphate rinses may contain residual phosphates and oils and greases removed from the surface of the castings. The storm water run-offs also end up in the cooling pond, which discharges into a creek, a tributary of the Sydenham River. During monitoring, the average flow recorded at the cooling pond overflow (control point #0100) was 276.6 cubic meters per day.

Water used for sanitary purposes is treated in a septic tank and tile weeping bed.

Process fluid and machine coolant enter the floor drains and discharge to a waste tank. Water is first treated through the oil separator and then trucked to municipal treatment facility.

Franklin Electric of Canada Ltd. closed its facility in Strathroy in the summer of 1991.

Figure 5. EFFLUENT FLOW SCHEMATIC FRANKLIN ELECTRIC OF CANADA LTD.



2.6 GENERAL MOTORS OF CANADA LTD., St.Catharines

General Motors of Canada Limited operates a Foundry and Engine Plant on Glendale Avenue in St. Catharines. The facilities occupy a site of approximately 150 acres located south of Glendale Avenue and east of the Welland Ship Canal of the St. Lawrence Seaway Authority. The Foundry and Engine Plant employed approximately 4,650 people during the MISA monitoring period.

The Foundry produced approximately 1,510 tonnes per day of grey and nodular iron automotive castings during the monitoring period. Castings are produced on five mold lines, A, B. C, D and E. A and E mold lines produce nodular iron castings such as: crankshafts, callipers, knuckles, bearing caps, exhaust manifolds, differential cases and carriers. B, C and D mold lines produce grey iron castings such as: blocks, cylinder heads, rotors, brake drums, bearing caps and water pumps. The Engine Plant machines and assembles V6 and V8 engines.

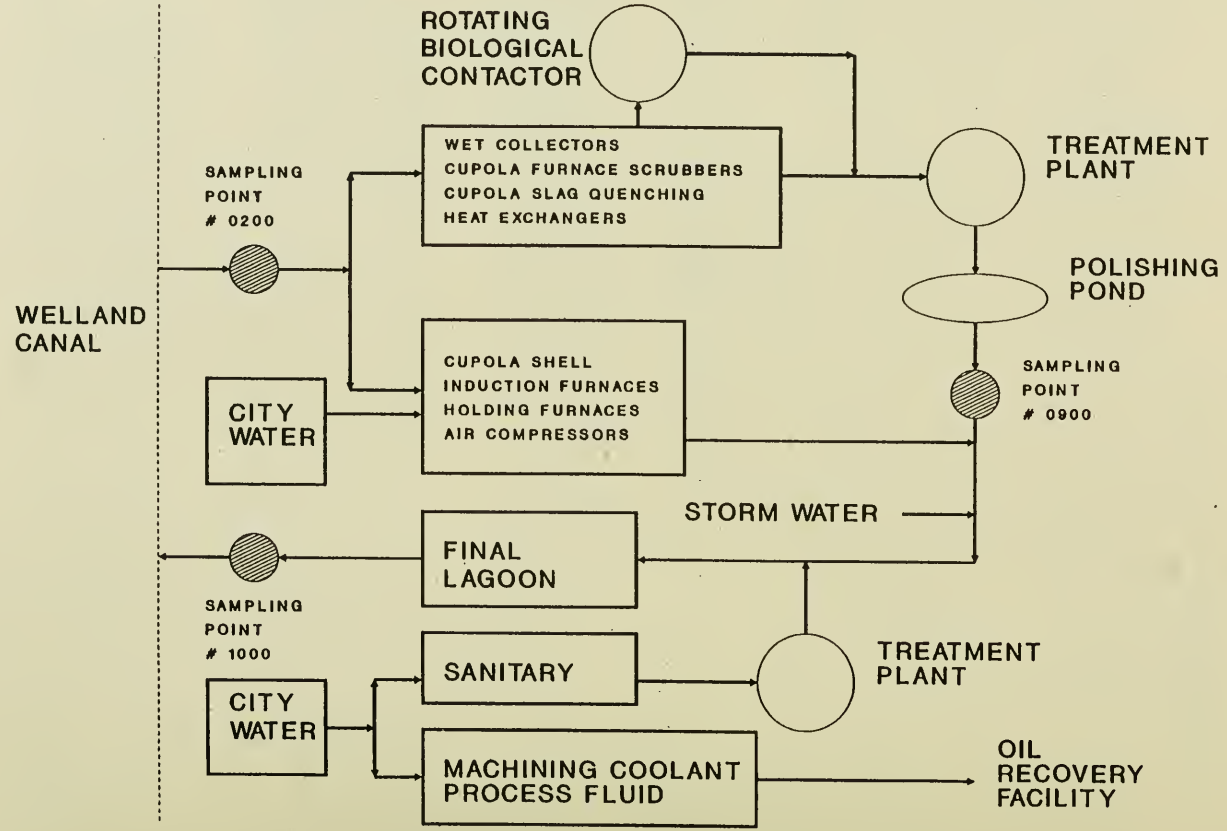
The facilities use approximately 160,000 cubic meters per day of water for non-contact cooling and process requirements. The majority of water is gravity-fed via a pipe line from the Welland Canal (Figure 6). The remainder of the water is supplied via a city water main.

Process water, comprising approximately one-half of the total water required, is used for wet dust collectors, cupola furnace exhaust wet cap and venturi scrubbers and cupola slag quenching. The majority of the remaining water is used for non-contact cooling of cupola shells, induction furnaces, holding furnaces and air compressors.

One process water stream containing high concentrations of phenolics is treated through the Rotating Biological Contactor (RBC). Effluent from the RBC and all other process water from the Foundry are treated at the suspended solids treatment plant consisting of coagulation/flocculation and sedimentation (two parallel clarifiers). Effluent from this plant is discharged into a polishing pond which discharges into a ditch. The process flow measurement and sampling point (control point #0900) is located at the discharge from the polishing pond.

Non-contact cooling water, storm water and effluent from an on-site sanitary plant intercept the ditch downstream of the polishing pond. The combined effluent enters a final lagoon for further polishing prior to being discharged to the Welland Canal system. The combined flow measurement and sampling point (control point #1000) is located at the discharge from the final lagoon. Its average daily flow recorded during monitoring was 135,627 cubic meters.

Figure 6. EFFLUENT FLOW SCHEMATIC
GENERAL MOTORS OF CANADA LTD.



2.7 HALEY INDUSTRIES LIMITED
Haley, Ontario

Haley Industries is located near Haley, Ontario, at the intersection of Renfrew County Road 7 and Ross Township 5th line. Haley Industries produces magnesium and aluminum castings for the aerospace industry.

During the monitoring year, Haley discharged on average 128 m^3/day of process wastewater to McLaren's creek (Figure 7). In addition, an average of 107 m^3 of storm water was discharged per storm event monitored.

The process wastewater includes discharges from the Wastewater Treatment Plant (WWTP), Sewage Treatment Plant (STP) and wet dust collectors. The WWTP consists of a number of batch treatment processes treating wastewater from the SO_2 mould curing process, acid etch process, and chromate pickling process.

The effluent from the SO_2 mould curing process consists of sulphur dioxide and sodium sulphate/sulphite, dissolved in a sodium hydroxide solution. The mixture is first allowed to settle, then the supernatant is pumped through a carbon filter before being discharged.

The effluent from the acid dip tanks and dragout tanks, in the acid etch process, are neutralized with calcium hydroxide and allowed to settle. The supernatant is then pumped to drain.

Sodium hydroxide is added to the acid and chromate rinse overflow to adjust the pH to 7. After that the water is stored in one of the storage tanks in the WWTP before its discharge.

The dragout water from the chromate pickle operation is treated to convert hexavelant to trivalent chromium. This is achieved by adding sulphuric acid to the solution and then adding sodium metabisulphite. On completion, calcium hydroxide is added to neutralize the effluent and permit precipitation of contaminants. The supernatant is then discharged.

The overflowing rinse waters from the acid etch and chromate pickle processes are neutralized with sodium hydroxide and then discharged.

Spent fixer from two X-Ray processors is treated in silver recovery units and then combined with the overflowing rinse from the processors. This waste stream then combines with the waste streams being discharged from the WWTP.

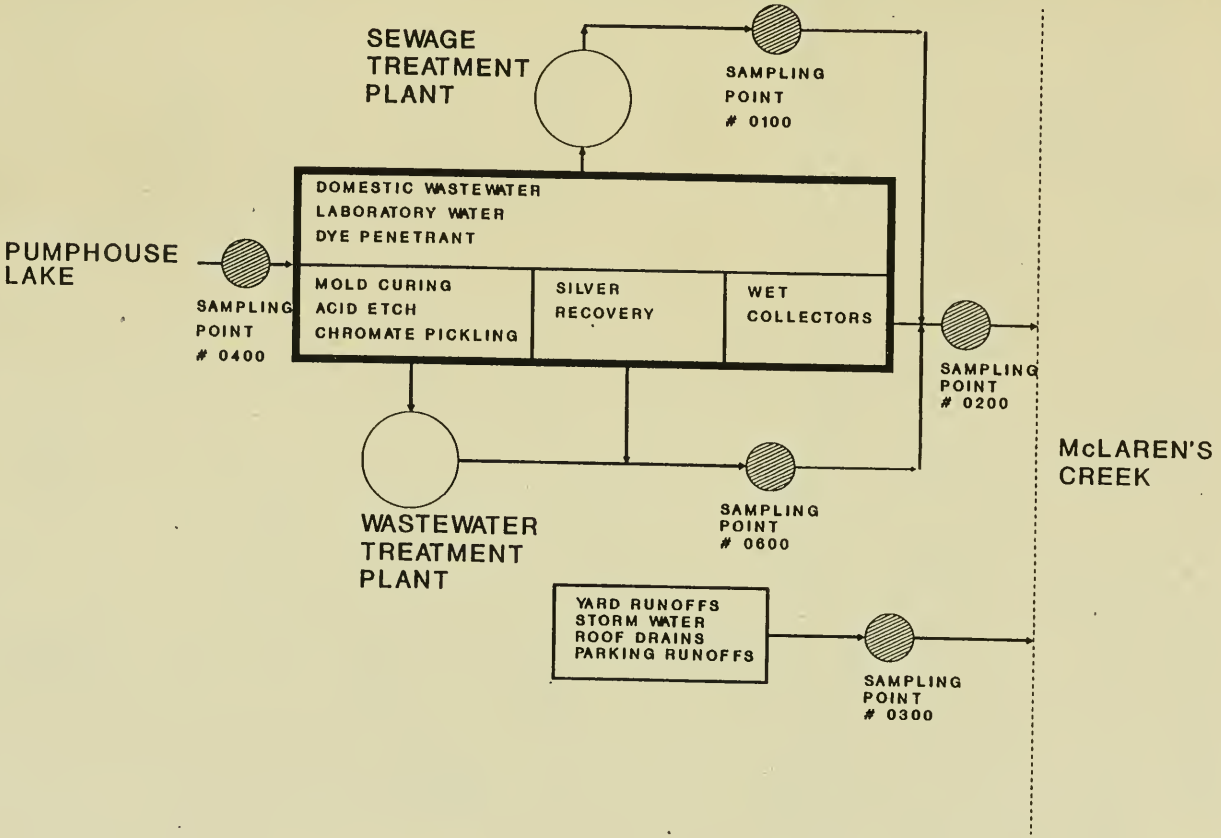
The Sewage Treatment Plant (STP) consists of an extended aeration biological process. It receives domestic wastewaters, water from laboratory sinks, and effluent from the Fluorescent Penetrant Inspection (FPI) process. The FPI effluent is passed through activated carbon filters, to remove oil and fluorescent dye, before being discharged to the STP.

Dust is created in the Wheelabrator shot blast machines, sanding and grinding booths and the Rotary Multiple Hanging (RMH) blast machine. The dust collection processes used for these machines consist of wet scrubbing of the air. The resulting wastewater is discharged into the process wastewater stream.

Storm water collected from plant roof areas, car parks and yard areas is discharged to McLaren's creek separately from the process wastewater.

The total amount of melted metal produced during the monitoring period was 271 tonnes aluminum and 720 tonnes magnesium.

Figure 7. EFFLUENT FLOW SCHEMATIC HALEY INDUSTRIES LTD.



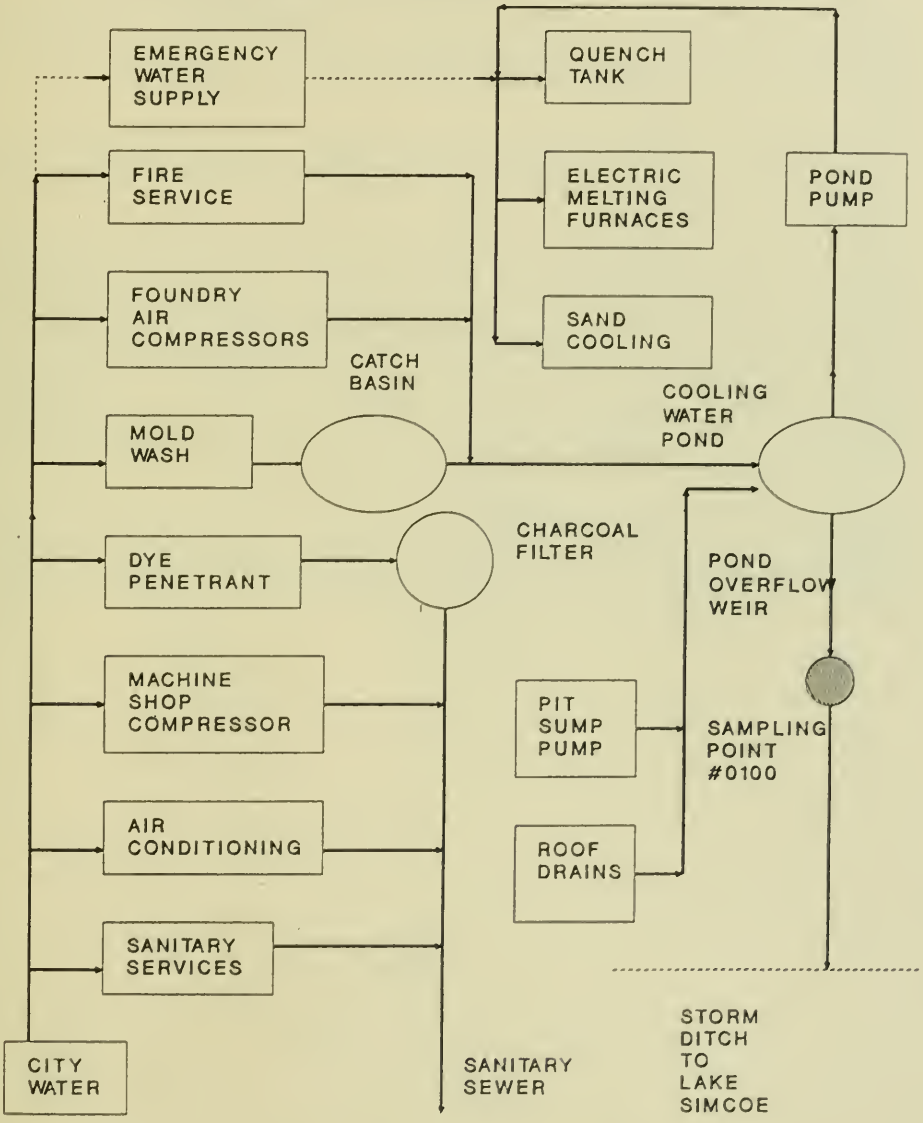
2.8 KUBOTA METAL CORPORATION, FAHRAMET DIVISION
Orillia

Kubota Metal Corporation produces steel castings for various industries but mainly for the petrochemical sector. The facility is located in Orillia on Highway 11. During the year of monitoring the company's produced 28 tonnes of steel per day.

Kubota uses very little water for process applications. All dust collection is by dry methods (i.e. baghouses). City water is used for cooling furnaces and compressors (Figure 8). Water from the cooling loops flows to the cooling pond where it is recycled back to the plant. The sanitary effluent and dye penetrant rinses are discharged to the municipal sewage treatment plant.

The cooling pond discharge was monitored under the MISA program. The average discharge from the pond during the monitoring program was 360 cubic meters per day. There is no specific effluent treatment process at Kubota.

Figure 8. EFFLUENT FLOW SCHEMATIC
KUBOTA METAL CORPORATION, FAHRAMET DIVISION



2.9 RICHMOND DIE CASTING LTD., Cornwall

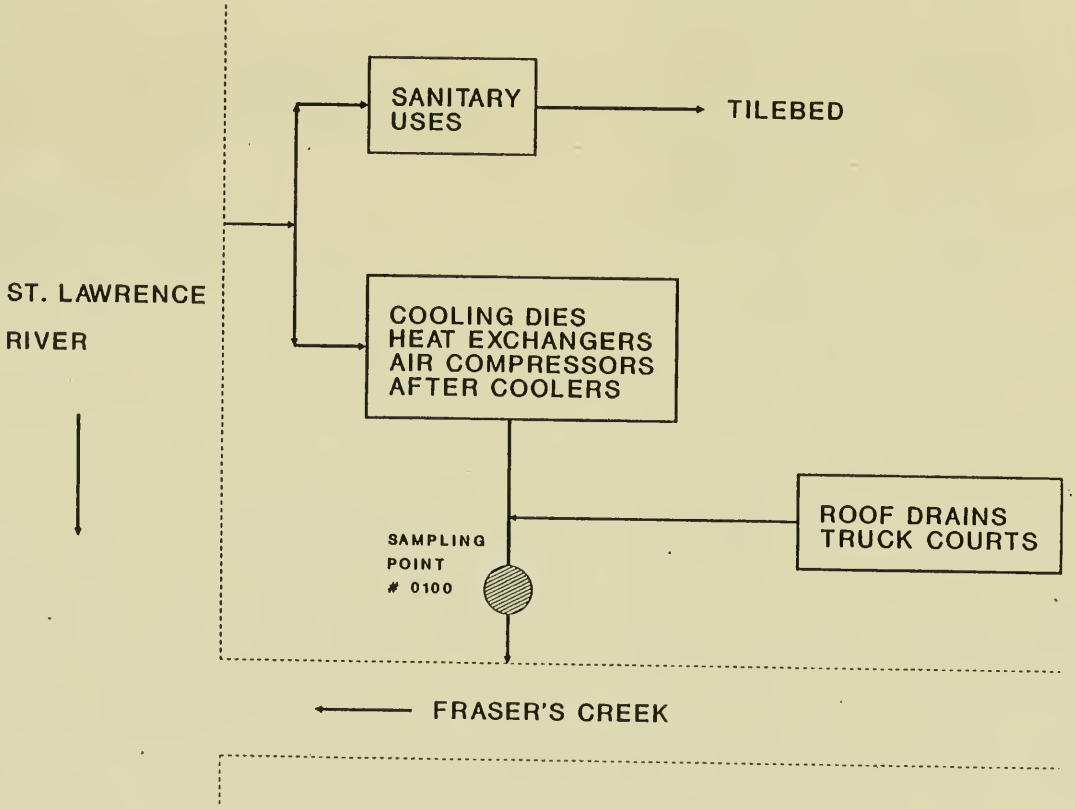
Richmond Die Casting Ltd. is an aluminum die casting company located in Cornwall, Ontario, on the St. Lawrence River, north of Hwy#2, on the west side of Richmond Rd. Its products are aluminum components, mainly automotive parts. During the year of monitoring the company's production was 11.3 tonnes of aluminum per day.

Richmond takes water directly from the St. Lawrence River (Figure 9). This untreated and unfiltered water is used for process and sanitary purposes.

Richmond's main sources of wastewater are: die casting machine heat exchangers and dies, air compressors and aftercoolers, roof drains, truck courts and sanitary objects. Sanitary effluent is treated through a tilebed located on the company's property. Other wastewater is discharged into Fraser's Creek which goes directly into the St. Lawrence River (downflow from the intake point). During one year of monitoring, the company only sampled this particular discharge point (#0100) - classified as the "cooling water effluent stream". An average of 1,984 m^3/day of cooling water was discharged during that time.

The only other water treatment carried out at Richmond in addition to the tilebed treatment of sanitary effluent, is the filtration (NUMOR recovery system) and eventual recycle of their cutting fluids which are used during machining process.

Figure 9. EFFLUENT FLOW SCHEMATIC
RICHMOND DIE CASTING LTD.



2.10 WESTERN FOUNDRY COMPANY LIMITED, Wingham

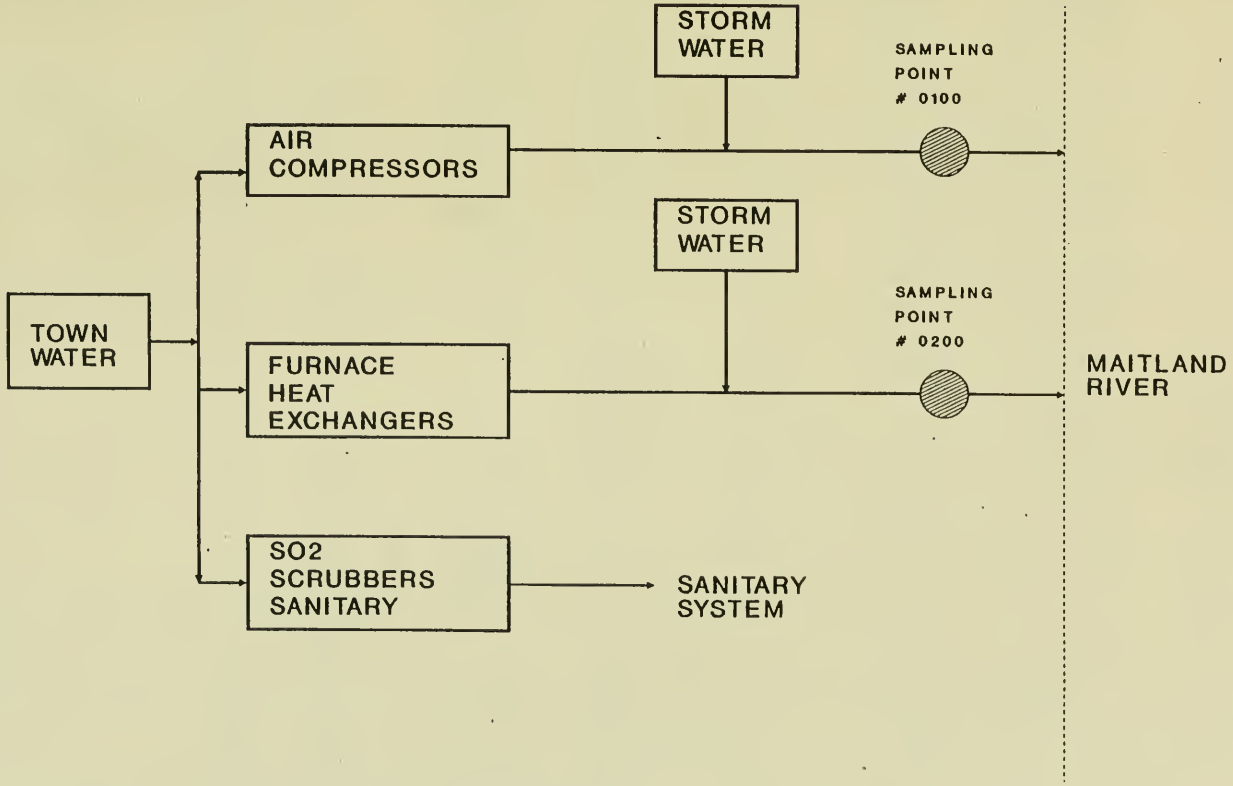
Western Foundry is located in the northern part of the town of Wingham on the West side of the Maitland river. During the monitoring period, Western Foundry produced 21,000 tons of exhaust manifolds for the automotive trade.

The company uses town water for cooling air compressors, furnaces, heat exchangers and for sanitary purposes (Figure 10). Cooling water and storm water are discharged directly into the two streams which flow to the Maitland River. Effluent from the SO_2 scrubbers is discharged into the sanitary system.

Two control points were involved in the monitoring period. The control point which typically handled compressor cooling water had an average flow of 370 cubic meters per day. The other control point which typically handled furnace heat exchangers, had an average flow of 921 cubic meters per day. Since storm events were not monitored, data are not available for flow rate increases that would be expected to take place during storms.

Flow monitoring was not done on the intake supply. The average daily intake flow was estimated to be 1,673 cubic meters.

Figure 10. EFFLUENT FLOW SCHEMATIC
WESTERN FOUNDRY COMPANY LTD.



3.0 EFFLUENT MONITORING REQUIREMENTS

3.1 General

The Sector plants monitored for 161 Conventional and Priority Pollutants. The Priority Pollutants were selected from the Effluent Monitoring Priority Pollutants List (EMPPL) on the basis of information gathered during the pre-regulation monitoring[3]. A list of these parameters, their units and the existing guidelines are presented in Appendix I.

Detailed technical rationale for the selection of parameters and monitoring strategy are outlined in the Development Document for the Effluent Monitoring Regulation for the Metal Casting Sector[4]. The reporting requirements are included in the Metal Casting Effluent Monitoring Regulation O. Reg. 648/89, as amended to O.Reg. 232/90 and O.Reg. 419/90.

At the end of the twelve-month monitoring period, three plants (Ford, General Motors and Haley) were required to carry out an Extended Weekly Monitoring for another year.

3.2 Effluent Streams

Under the Effluent Monitoring Regulation, fifteen effluent control points and one emergency overflow were monitored at ten plants. A list of companies and their sampling streams is presented in Table 2.

The monitoring of intake water was not a regulatory requirement, however, four companies (General Motors, Richmond Die Casting, Ford and Haley Industries) submitted intake water data to the Ministry on a voluntary basis.

3.3 Sampling Requirements and Frequencies

Through site-specific schedules, all plants were required to carry out routine monitoring for specified parameters at the frequencies presented in Table 3.

In addition to routine monitoring, six plants carried out characterization of their effluent(s) on a quarterly basis, to identify and quantify the complete list of 161 parameters.

TABLE 2 - LIST OF COMPANIES AND EFFLUENT STREAMS

COMPANY NAME - LOCATION	CONTROL POINT	STREAM CLASSIFICATION	SAMPLING POINT
CANADA ALLOY CASTING LTD., KITCHENER	0100	COOLING WATER	COOLING WATER STORM SEWER
CANADA PIPE COMPANY LTD., HAMILTON	0100	COMBINED EFFLUENT (FINAL)	CUPOLA SCRUBBER
CHRYSLER CANADA LTD., ETOBICOKE	0100	COOLING WATER	STORM SEWER
FORD MOTOR COMPANY OF CANADA, WINDSOR	0100	COMBINED EFFLUENT (FINAL)	LAGOON EFFLUENT
	0200	INTAKE WATER	DETROIT RIVER WATER
	0300	PROCESS EFFLUENT	PROCESS
	0500	EMERGENCY OVERFLOW	COMBINED EMERGENCY OVERFLOW
FRANKLIN ELECTRIC OF CANADA, STRATHROY	0100	COOLING WATER	COOLING POND EFFLUENT
	0200	INTAKE WATER	INTAKE WATER
GENERAL MOTORS OF CANADA, ST.CATHARINES	0200	INTAKE WATER	WELLAND CANAL
	0900	PROCESS EFFLUENT	FOUNDRY PROCESS
	1000	COMBINED EFFLUENT (FINAL)	FOUNDRY COMBINED
HALEY INDUSTRIES LTD., HALEY	0100	COMBINED EFFLUENT	SEWAGE TREATMENT PLANT
	0200	PROCESS EFFLUENT (FINAL)	EAST PROCESS SEWER
	0300	STORM WATER EFFLUENT	WEST STORM SEWER
	0400	INTAKE WATER	PUMPHOUSE LAKE
	0600	WASTE WATER EFFLUENT (FLOW)	WASTE WATER TREATMENT PLANT FLOW
KUBOTA METAL, FAHRAMET DIV., ORILLIA	0100	COOLING WATER	COOLING
RICHMOND DIE CASTING LTD., CORNWALL	0100	COOLING WATER	COOLING
	0200	INTAKE WATER	ST. LAWRENCE RIVER
WESTERN FOUNDRY CO. LTD., WINGHAM	0100	COOLING WATER	ARTHUR STREET
	0200	COOLING WATER	CNR BRIDGE
	0300	INTAKE WATER	TOWN SUPPLY

TABLE 3 – MONITORING SCHEDULE

ATG	PARAMETER	CANADA ALLOY	CANADA PIPE	CHRYSLER	FORD MOTORS COMPANY			FRANKLIN	GENERAL MOTORS	
		Cooling	Combined	Cooling	Process	Combined	Emergency Overflow	Cooling with pot.	Process	Combined
1.	COD				TW	TW	YES		TW	W
2.	TOTAL CYANIDE				M	M			M	M
3.	pH	M	W	M	D	D	YES	M	D	TW
4A.	NITROGEN NH3/NH4				M	M			M	M
4B.	NITRATE/NITRITE				M	M			M	
5A.	DISSOLVED ORGANIC CARBON	M	M	M	W	W		M	W	W
5B.	TOTAL ORGANIC CARBON						YES			
6.	TOTAL PHOSPHORUS				W	W			W	W
7.	SPECIFIC CONDUCTANCE				D	D			D	TW
8.	TOTAL SUSPENDED SOLIDS	M	W	M	D	D	YES	M	D	TW
9.	TOTAL METALS	M	M	M	TW	TW		M	TW	W
11.	CHROMIUM (HEXAVALENT)	M	M	M	TW	TW		M	TW	W
12.	MERCURY				M	M			M	M
13.	TOTAL ALKYL LEAD	M	M	M	M	M		M	M	M
14.	PHENOLICS (4AAP)	M	W	M	D	D	YES		D	TW
15.	SULPHIDE				M	M		M	M	
16.	VOLATILES, HALOGENATED				M	M			M	
17.	VOLATILES, NON–HALOGENATED				M	M			M	
18.	VOLATILES, WATER SOLUBLE				M	M			M	
19.	EXTRACTABLES, BASE NEUTRAL				M	M			M	M
	–NAPHTHALENE				W		YES		W	
	–PHENANTHRENE				W		YES		W	
20.	EXTRACTABLES, ACID (PHENOLICS)				M	M			M	M
25.	SOLVENT EXTRACTABLES	M	W	M	TW	TW	YES	M	TW	TW
26.	FATTY AND RESIN ACIDS				M	M			M	
27.	POLYCHLORINATED BIPHENYLS (TOTAL)	Q	Q	M	M	M	YES		M	M
MC1	IRON	M	M	M	TW	TW	YES	M	TW	W
	MAGNESIUM	M	M	M	TW	TW	YES	M	TW	W
MC2	FLUORIDE	M	M	M	TW	TW	YES	M	TW	W
	CHARACTERIZATION	–	Q	–	Q	Q	–	Q	Q	Q
	ATG#24 DIOXINS AND FURANS	–	–	–	SA	SA	–	–	SA	SA
	OPEN CHARACTERIZATION	–	Q	–	Q	Q	–	–	Q	Q
	TOXICITY	SA	Q	SA	–	M	–	Q	–	M
	QA/QC	–	YES	–	YES	–	–	–	YES	–

NOTE: D = DAILY W = WEEKLY TW = THRICE WEEKLY M = MONTHLY Q = QUARTERLY SA = SEMI–ANNUALLY

TABLE 3 – MONITORING SCHEDULE
(continued)

ATG#	PARAMETER	HALEY			KUBOTA	RICHMOND	WESTERN	
		Process	Combined	Storm	Cooling with pot.	Cooling	Cooling	Cooling
1.	COD	TW	TW	M				
2.	TOTAL CYANIDE	M		M				
3.	pH	D	D		M	M	M	M
4A.	NITROGEN NH3/NH4	TW	TW	M				
4B.	NITRATE/NITRITE	W		M				
5A.	DISSOLVED ORGANIC CARBON	W	W	M	M	M	M	M
5B.	TOTAL ORGANIC CARBON							
6.	TOTAL PHOSPHORUS	W	W	M				
7.	SPECIFIC CONDUCTANCE	D						
8.	TOTAL SUSPENDED SOLIDS	D	D	M	M	M	M	M
9.	TOTAL METALS	TW		M	M	M	M	M
11.	CHROMIUM (HEXAVALENT)	TW		M	M	M	M	M
12.	MERCURY	M						
13.	TOTAL ALKYL LEAD	M		M	M		M	M
14.	PHENOLICS (4AAP)	D		M	M		M	M
15.	SULPHIDE	M		M				
16.	VOLATILES, HALOGENATED	M	Q					
17.	VOLATILES, NON–HALOGENATED	M	Q					
18.	VOLATILES, WATER SOLUBLE		Q					
19.	EXTRACTABLES, BASE NEUTRAL	M	Q					
	–NAPHTHALENE							
	–PHENANTHRENE							
20.	EXTRACTABLES, ACID (PHENOLICS)	M	Q					
25.	SOLVENT EXTRACTABLES	TW	TW	M	M	M	M	M
26.	FATTY AND RESIN ACIDS	M						
27.	POLYCHLORINATED BIPHENYLS (TOTAL)	M					Q	Q
MC1	IRON	TW		M	M	M	M	M
	MAGNESIUM	TW		M	M	M	M	M
MC2	FLUORIDE	TW		M	M	M	M	M
	CHARACTERIZATION	Q	–	–	Q	–	–	–
	ATG#24 DIOXINS AND FURANS	SA	–	–	–	–	–	–
	OPEN CHARACTERIZATION	Q	–	–	–	–	–	–
	TOXICITY	M	–	–	Q	SA	SA	SA
	QA/QC	YES	–	–	–	–	–	–

NOTE: D = DAILY W = WEEKLY TW = THRICE WEEKLY M = MONTHLY Q = QUARTERLY SA = SEMI–ANNUALLY

Four plants performed quarterly open characterization of their effluent(s). The purpose of this was to identify and determine the approximate quantities of any volatile and extractable organic parameters and check for 70 specified metals using mass spectroscopy and emission spectrometry. Any new parameter found in significant quantities, would be considered for addition to the EMPPL.

Three plants were required to sample their effluent(s) for dioxins and furans on a semi-annual basis.

3.4 Quality Assurance/Quality Control

Under the Effluent Monitoring Regulation four plants (Canada Pipe, Ford, General Motors and Haley) were required to carry out an extensive Quality Assurance/Quality Control (QA/QC) program (Table 3) to ensure that the data collected during monitoring were valid.

The QA/QC tests required the collection of duplicate samples, travelling blank and travelling spiked blank samples. These tests were carried out either on the process or on the combined effluent streams. The QA/QC was not carried out on dioxins and furans.

The industry undertook monitoring of their plants' effluent according to the regulation. Ministry regional staff inspected the plants during the monitoring period (sampling location, equipment, sampling and analytical procedures) and collected samples to verify the analytical data obtained by the industry. To ensure a quality database, laboratories contracted by industry were required to meet a Ministry-specified detection limits for each of the parameters to be monitored (Regulation Monitoring Detection Limit = RMDL). Only regulation-specified analytical methods could be used for parameter analysis.

Staff of the Ministry's Laboratory Services Branch (LSB) carried out on-site inspections of the laboratories contracted to undertake the analyses for the Sector, to ensure compliance with the MOE's analytical protocol.

The results of the QA/QC assessment are published in a separate report[5].

3.5 Toxicity

All of the companies were required to carry out acute lethality tests at their final discharge point using both, Rainbow trout and Daphnia magna, at the frequencies identified in Table 3.

3.6 Flow

Flow monitoring was required on a continuous basis for all process and combined effluent streams. Cooling and storm water effluent stream flows were only measured at the time of sampling. The flow rate at the Ford plant's emergency overflow point was estimated.

3.7 Reporting

Each company was required by the Effluent Monitoring Regulation to report the data to the Regional MOE Office using hard copies and floppy diskettes customized for each plant site under the MISA Data Entry System (MIDES). The Regional Office checked diskettes for completeness and transferred the data to the Ministry Sampling Information System (SIS) central computer system.

4.0 TREATMENT OF DATA

4.1 Quantity of Analytical Data

The final twelve-month effluent monitoring database collected by industry for the MISA Metal Casting Sector contains 53,750 data points. Table 4 outlines the total number of data points, including the QA/QC data, obtained from the fifteen effluent streams and one emergency overflow sampling point.

4.2 Validation

The validation process was carried out by the MISA Industrial Office using the data downloaded from SIS. The Ministry, in cooperation with industry, checked and corrected the data for input errors.

Under the MIDES program, laboratories were required to clarify or qualify each data entry by using the remark codes reported in Appendix II. Data with no remark codes, or those that had the following remark codes: <, <DL, <T, A, and AR, were accepted as "valid". Data submitted with any other remark code and the data equal to zero (concentration value of the parameter PVAL=0) were rejected as questionable. The questionable data amounted to less than 1% of the total database.

4.3 Reported Parameters

A complete list of the 161 monitored parameters, their Regulation Method Detection Limits (RMDLs) and their units, is presented in Appendix I. For general information, also included in the Appendix are the Industrial Discharge Limits (IDL) and the Provincial Water Quality Objectives/Guidelines (PWQO/G).

The parameters listed in Table 5 are the "found" parameters. They were selected using the statistical criteria outlined in the Issue Resolution Document[1]. The rule states that "A parameter is selected, unless a statistically determined 0.90 proportion of the data are less than the RMDL for that parameter at 95% confidence level". This is known as the 90/10 editing rule.

The four conventional parameters, common for all the plants (pH, dissolved organic carbon, total suspended solids and oil and grease) are reported in all the tables regardless of the results of 90/10 editing rule for these parameters.

TABLE 4 - QUANTITY OF EFFLUENT MONITORING DATA

COMPANY NAME AND LOCATION	EFFLUENT MONITORING	QA/QC DATA	TOTAL
CANADA ALLOY CASTING LTD., KITCHENER	268	0	268
CANADA PIPE COMPANY LTD., HAMILTON	1622	457	2079
CHRYSLER CANADA LTD., ETOBICOKE	277	174	451
FORD MOTOR COMPANY OF CANADA, WINDSOR	13138	4797	17935
FRANKLIN ELECTRIC OF CANADA, STRATHROY	993	641	1634
GENERAL MOTORS OF CANADA, ST. CATHARINES	11229	4862	16901
HALEY INDUSTRIES LTD., HALEY	8727	4466	13193
KUBOTA METAL, FAHRAMET DIV., ORILLIA	999	304	1303
RICHMOND DIE CASTING LTD., CORNWALL	261	0	261
WESTERN FOUNDRY CO. LTD., WINGHAM	535	0	535
SECTOR TOTAL	38049	15701	53750

4.4 Long Term Average Concentrations

Appendix III contains the tables of Long Term Average (LTA) concentrations, as well as the concentration ranges (minimum and maximum) for each of the monitored plants. The LTA values were calculated using all the data with the acceptable (see Section 4.1) remark codes. The data with "<DL" (less than the detection limit) remark code were treated with special consideration, using the following replacement rule:

- to calculate minimum Long Term Average all values found <RMDL were set to zero (PVAL=0)
- to calculate maximum LTA, all values found <RMDL were set to RMDL (PVAL=RMDL), and
- to calculate LTA, all values found <RMDL/10 were set to RMDL/10 (PVAL=RMDL/10).

TABLE 5 – "FOUND" PARAMETERS

COMPANY NAMES AND CONTROL POINT NUMBERS

ATG	PARAMETER	CA	CP	CHR	FORD			FE	GM			HALEY				KUB	RICH		WEST		
		0100	0100	0100	0100	0300	0500	0100	0200	0900	1000	0100	0200	0300	0400	0100	0100	0200	0100	0200	0300
1	Chemical Oxygen Demand		X		X	X	X	X		X	X	X	X	X	X	X					
2	Cyanide Total		X		X	X				X	X		X	X	X	X					
4a	Ammonia plus Ammonium		X		X	X		X		X	X	X	X	X		X					
4a	Total Kjeldahl Nitrogen		X		X	X		X	X	X	X		X			X					
4b	Nitrate+Nitrite		X		X	X		X		X	X		X	X	X	X					
5a	DOC	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X
5b	TOC		X		X	X		X					X			X					
6	Total Phosphorus		X					X			X	X	X	X	X	X					
7	Specific Conductance		X		X	X		X		X	X		X			X					
8	Total Suspended Solids		X		X	X	X	X	X	X	X	X	X	X		X	X			X	X
8	Volatile Suspended Solids				X	X															
9	Aluminum	X	X	X	X	X		X		X	X		X	X	X	X	X	X	X	X	
9	Beryllium												X	X	X						
9	Cadmium	X	X	X	X	X		X		X	X		X		X						
9	Chromium		X	X						X	X		X	X	X						
9	Cobalt												X	X	X						
9	Copper	X	X	X	X	X							X	X	X	X			X	X	X
9	Lead		X	X	X	X				X	X		X	X	X						
9	Molybdenum		X		X								X		X						
9	Nickel		X	X				X					X		X						
9	Silver												X			X					
9	Thallium							X													
9	Vanadium			X				X					X	X	X						
9	Zinc	X	X	X	X	X		X		X	X		X	X	X	X	X	X	X	X	
10	Antimony		X										X								
10	Arsenic		X										X								
10	Selenium		X										X								
11	Chromium (hexavalent)							X									X				
12	Mercury		X		X	X							X		X						

TABLE 5 (cont.) – "FOUND" PARAMETERS

COMPANY NAMES AND CONTROL POINT NUMBERS

ATG	PARAMETER	CA	CP	CHR	FORD			FE	GM			HALEY				KUB	RICH		WEST		
		0100	0100	0100	0100	0300	0500	0100	0200	0900	1000	0100	0200	0300	0400	0100	0100	0200	0100	0200	0300
13	Tetra–alkyl lead (Total)		X																		
13	Tri–alkyl lead (Total)		X																		
14	Phenolics (4AAP)		X		X	X	X		X	X	X		X	X		X			X	X	
15	Sulphide		X												X	X					
16	1,1–Dichloroethane											X	X								
16	Chloroform									X	X					X					
16	Methylene Chloride											X	X		X						
16	Trichlorofluoromethane														X						
17	Benzene				X	X				X											
17	Styrene					X															
17	Toluene				X	X				X					X						
17	m–Xylene and p–Xylene									X											
17	o–Xylene												X								
19	1–Methylnaphthalene					X															
19	2–Methylnaphthalene					X															
19	Benzobutylphthalate				X	X															
19	Biphenyl					X															
19	Bis(2–ethylhexyl)phthalate		X		X	X				X		X	X								
19	Di–n–butyl Phthalate					X															
19	Fluoranthene					X															
19	Naphthalene					X															
19	Phenanthrene					X	X														
20	2,4–Dimethylphenol				X	X				X											
20	4–Nitrophenol											X	X		X						
20	Pentachlorophenol											X	X		X						
20	Phenol					X				X		X									
20	m–Cresol					X				X											
20	o–Cresol					X				X											
20	p–Cresol					X				X											

TABLE 5 (cont.) – "FOUND" PARAMETERS

COMPANY NAMES AND CONTROL POINT NUMBERS

ATG	PARAMETER	CA	CP	CHR	FORD			FE	GM			HALEY				KUB	RICH		WEST		
		0100	0100	0100	0100	0300	0500	0100	0200	0900	1000	0100	0200	0300	0400	0100	0100	0200	0100	0200	0300
23	1,2,3-Trichlorobenzene												X								
24	Octachlorodibenzo-p-dioxin				X	X				X			X								
24	Octachlorodibenzofuran				X	X															
24	Total H6CDD												X								
24	Total H6CDF					X							X								
24	Total H7CDD												X								
24	Total H7CDF												X								
24	Total PCDF				X								X								
24	Total TCDF				X	X							X								
25	Oil and Grease	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
26	Abietic Acid							X		X	X		X								
26	Chlorodehydroabietic Acid												X								
26	Isopimaric Acid												X								
26	Levopimaric Acid									X	X		X								
26	Neoabietic Acid									X	X		X								
26	Oleic Acid												X								
26	Pimaric Acid												X								
27	PCBT				X	X	X														
MC1	Iron	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X
MC1	Magnesium	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X
MC2	Fluoride	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X

NOTE: X INDICATES THAT A PARAMETER IS SELECTED AT THAT CONTROL POINT.

CA	CANADA ALLOY CASTING LTD., KITCHENER	GM	GENERAL MOTORS OF CANADA, ST. CATHARINES
CP	CANADA PIPE COMPANY LTD., HAMILTON	HALEY	HALEY INDUSTRIES LTD., HALEY
CHR	CHRYSLER CANADA LTD., ETOBICOKE	KUB	KUBOTA METAL, FAHRAMET DIV., ORILLIA
FORD	FORD MOTOR COMPANY OF CANADA, WINDSOR	RICH	RICHMOND DIE CASTING LTD., CORNWALL
FE	FRANKLIN ELECTRIC OF CANADA, STRATHROY	WEST	WESTERN FOUNDRY CO. LTD., WINGHAM

4.5 Discharge Flows

Detailed tables of the monthly average daily flows are presented in Appendix IV. The averages of the daily discharge flows are tabulated for each plant, to provide a perspective on the potential impact of flow on the calculation of loadings from the plant sites. To observe the variations in the discharge flows, all values are also presented in a graphical form.

4.6 Long Term Average Loadings

Loadings were calculated by multiplying reported daily flow by daily concentration. If either one of the daily values was not provided, the loading was not calculated for that day. Since the intake water database was very limited, the average loading was calculated by multiplying average concentration of each parameter with an average flow. The LTA loadings are presented together with the loading ranges (minimum and maximum values) in Appendix V.

It should be pointed out that a)- all loading values presented in this report are gross values, calculated and reported without taking into consideration the intake water contaminants and their loadings, b)-although in some cases the concentration of a parameter may be near or at the RMDL, the loading value may still be substantial because of the high flows.

The loading units are kg/day for all the parameters, except for some organics, whose units are in g/day or in mg/day.

4.7 Intake water

Only one company (General Motors) reported intake water data throughout the monitoring period (calculated value using the measured intake water flow rate and an estimate of evaporation). The other two companies (Richmond and Haley) submitted either measured or estimated values for their flow. The concentrations were recorded for a limited number of parameters. When there were two or more data points per parameter provided, the statistical calculations could be applied, and the loadings were calculated. For a single point (Ford data) this criterion could not be applied.

Intake water loading results are tabulated and plotted in Appendix VI, alongside the final discharge loadings of the "found" parameters.

When reviewing these results, one should keep in mind that the intake water data may be the result of two, three or twelve samples, while the final discharge loadings are the LTA values calculated using the data from the entire year of monitoring.

4.8 Inspection and Monitoring Data

Ministry staff inspected the plants during the monitoring period (sampling location, equipment, sampling and analytical procedures) and collected samples to determine if the analytical data obtained by the industry was reasonable. In Appendix VII the twelve-month data are summarized as the actual, measured minimum, maximum and the LTA concentrations besides the value(s) obtained during the MOE inspection(s). If there were more than one inspection carried out (NI was 2 or 3), the average value was tabulated.

Initially all plants were scheduled to be inspected only once. In order to obtain enough representative data from the die casting plants (only 3 plants in this sector), two additional inspections and sample collections were carried out at the Franklin Electric Plant.

Effluent inspection samples were not collected at Canada Pipe because of the process modifications that took place at the plant.

4.9 Toxicity

Acute lethality tests on Rainbow trout and Daphnia magna were carried out on all the final effluents.

The detailed acute lethality results are reported in a separate document entitled "Acute Lethality Data for Ontario's Metal Casting Sector Effluents, covering period from May 1990 to May 1991", published by the Aquatic Toxicity Unit, MOE, August 1992[5].

5.0 DISCUSSION OF RESULTS

5.1 Long Term Average (LTA) Concentrations

The LTA concentrations of the "found" parameters are presented in Appendix III. Table 5, mentioned in Section 4.3, is useful as a screen for readily identifying contaminants that have been found at individual sites and their frequency of occurrence. From Table 5, eight parameters are determined to be common[1] for the plants of this sector. These are presented in Table 6:

TABLE 6 - THE FINAL EFFLUENT STREAM'S CONCENTRATION RANGE OF COMMON PARAMETERS

COMMON PARAMETERS	FINAL EFFLUENT STREAM CONCENTRATION RANGE (mg/L)	RMDL (mg/L)
DOC	0.2 - 70.1	0.5
Total Suspended Solids	4.2 - 1479.2	5.0
Aluminum	0.04 - 5.5	0.03
Zinc	0.02 - 313.3	0.01
Phenolics	0.006 - 0.2	0.002
Iron	0.1 - 408.4	0.02
Magnesium	7.8 - 3259	0.02
Fluoride	0.1 - 30.2	0.1

The highest LTA concentrations of dissolved organic carbon, total suspended solids, aluminum and zinc are found in Canada Pipe's plant effluent. At the end of monitoring, this company began to recycle its wastewater and is no longer a direct discharger.

An elevated LTA concentration of phenolics (0.2 mg/L) was found in Ford Motor's final effluent. The plant is presently looking at upgrading the wastewater treatment facility.

In addition to high concentrations of iron, magnesium, aluminum and zinc, compared to the other plants, Haley Industries' effluent contains the highest concentrations of fluoride.

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[1] Members of the Data Evaluation Sub-Committee defined the term "common" parameters, as the parameters that are found in the effluent streams of seven or more plants.

The present Haley's treatment plant upgrade is expected to make measurable improvements with respect to the number of contaminants and their concentrations discharged to the environment.

The results from the storm water effluent stream at Haley (e.g. aluminum 1.6; fluoride 9.0 mg/L), show that the storm water has come into contact with the chemicals used in the process (e.g. via the yard or the roof drains).

Most companies have elevated concentrations of iron and magnesium in their effluents which likely originate from the raw material used at these plants.

The presence of TSS at the LTA concentration of 25.7 mg/L in Kubota's cooling water was determined to be due to algae growth in its cooling pond.

Traces of phenolics and aluminum were found in cooling waters from Western Foundry, Chrysler and Kubota plants' effluent. It is suspected that the source of phenolics are air emission deposits (via the roof drains), while aluminum is used in most cases as a raw material for various alloys and it enters the effluent stream via the yard drainage.

The most toxic form of dioxin, 2,3,7,8 TCDD was not found in any of the effluent streams, however, trace concentrations of the other congeners were detected as shown in Table 7. These results are based on the two samples collected during one-year of monitoring.

One reading of O8CDD found at the General Motors plant was below the RMDL, while the others found at Ford and Haley were either at or above the RMDL. Further sampling will be conducted by the MOE to confirm the findings on dioxins and furans.

As a follow-up, the Ministry sampled Haley's final effluent stream for dioxin and furan compounds. The only congener found was O8CDD, whose concentration was below the RMDL.

Two base neutral extractable compounds (ATG # 19) [benzo-buthyl-phthalate and Bis(2-ethylhexyl)phthalate] were found in Ford's final effluent and one [Bis(2-ethylhexyl)phthalate] in Haley's final effluent streams. Both parameters' LTA concentrations are noted to be above their respective RMDLs.

TABLE 7 - DIOXINS AND FURANS DATA

CONTAMINANTS	RMDL (ng/L)	STREAM	COMPANY NAME Concentrations (ng/L)		
			FORD	GM	HALEY
Hexachlorodibenzo-p-dioxins (total)	0.03	Final			0.03
Heptachlorodibenzo-p-dioxins (total)	0.03	Final			0.08
Octachlorodibenzo-p-dioxin	0.03	Final	0.04		0.61
		Process	0.07	0.03	
Pentachlorodibenzofurans (total)	0.015	Final	0.05		0.02
Tetrachlorodibenzofurans (total)	0.015	Final	0.13		0.01
		Process	0.07		
Hexachlorodibenzofurans (total)	0.02	Final			0.05
		Process	0.02		
Heptachlorodibenzofurans (total)	0.03	Final			0.03
Octachlorodibenzofuran	0.03	Final	0.04		
		Process	0.06		

Acid extractable compounds (ATG #20) were found in the final effluent streams of two plants: 2,4-dimethylphenol at an LTA concentration below the RMDL was found at Ford, while at Haley 4-Nitrophenol and Pentachlorophenol were found with LTA concentrations slightly above the RMDL. The main source of these two compounds in the Haley's final effluent is suspected to be the intake water (see the loading table and the plot for Haley in Appendix VI).

5.2 Discharge Flows

Discharge flows are tabulated in Appendix IV. A summary of the annual average flow rates is presented in Table 8. General Motors is the only high flow company (greater than 100,000 m^3/d), Ford, Chrysler, Richmond and Western are considered medium (between 1,000 and 100,000 m^3/d), while all the others can be categorized as low flow companies (below 1,000 m^3/d).

Due to the high flow rates at General Motors (135,627.1 m^3/d) and Ford (73,590.1 m^3/d) significant loadings of some parameters whose concentrations were at or near the RMDL were calculated. Concentrations near the detection-level are not always a positive-proof of the real presence of the parameter being measured.

Graphical presentations show that the flow rates vary in most streams, particularly #0200 control point at Western Foundry, while Richmond Die Casting has a relatively high, but stable flow.

TABLE 8 - FINAL DISCHARGE FLOWS

COMPANY NAME AND LOCATION	CONTROL POINT #	ANNUAL AVERAGE FLOW (m3/day)
CANADA ALLOY CASTING LTD., KITCHENER	0100	187.7
CANADA PIPE COMPANY LTD., HAMILTON	0100	115.3
CHRYSLER CANADA LTD., ETOBICOKE	0100	1484.0
FORD MOTOR COMPANY OF CANADA, WINDSOR	0100 0500 *	73590.1 1702.5 [1] 2.7 [2]
FRANKLIN ELECTRIC OF CANADA, STRATHROY	0100	276.6
GENERAL MOTORS OF CANADA, ST. CATHARINES	1000	135627.1
HALEY INDUSTRIES LTD., HALEY	0200 0300	128.7 107.1
KUBOTA METAL, FAHRAMET DIV., ORILLIA	0100	360.0
RICHMOND DIE CASTING LTD., CORNWALL	0100	1983.7
WESTERN FOUNDRY CO. LTD., WINGHAM	0100 0200	370.3 921.1

NOTE: * Ford Motor Company of Canada - control point #0500 is event oriented stream.
1 Total Volume Discharged (m3/day)
2 Total Discharge Duration (hours)

5.3 Long Term Average Sector Loadings

The LTA loadings (kg/d) of the "found" parameters in each plant's effluent streams are presented in Appendix V. The total Sector LTA loadings calculated for the parameters found at the final discharge points are presented in Table 9.

The eight parameters mentioned in Section 5.1 are not only "common" for this Sector, but they were found to have higher loadings than the other parameters across the Sector. Dissolved Organic Carbon is usually found in the effluents due to a leakage of the hydraulic fluids. Aluminum is often found in the effluent due to the contamination from the raw materials used, or it is present in suspended clay particles in intake waters. Some metals found in the effluent come from the scrap metal or raw material piles via yard drainage. Phenolics are usually found in waters coming from wet scrubbers (furnace exhaust scrubbers). Melting and metal finishing processes are often sources of fluorides.

Few organic chemicals were found in this Sector and their LTA loadings were very low. The total sector LTA loading of the non-halogenated volatiles from the ATG #17 (benzene, toluene and o-xylene) was 0.141 kg/d. Two base neutral extractable compounds (ATG # 19) were found in final effluent streams at a total LTA loading of 0.33 kg/d. Three acid extractable compounds found (ATG # 20) had a total loading of 0.55 kg/d. The two found in Haley's process and combined effluent streams (4-nitrophenol and pentachlorophenol) were also found in their intake water at the comparable levels.

Of the twenty one compounds listed on the Ministry's Primary List and the forty six on the Secondary List of Candidate Substances for Bans or Phase-Outs[2], nineteen were found in the final effluent streams of this Sector. Parameters found in the highest concentration range (between 0.15 and 29 mg/L) were arsenic, silver and copper, found at Haley Industries, and aluminum, cadmium, lead and zinc, found at Canada Pipe. As mentioned earlier, Canada Pipe is no longer a direct discharger, and Haley Industries has been upgrading their wastewater treatment plant since the end of monitoring.

TABLE 9 – SECTOR LOADINGS

LONG TERM AVERAGE (LTA) LOADINGS [kg/day]
AT FINAL DISCHARGE POINT
12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

ATG	PARAMETER	NLOAD	LTA
1	Chemical Oxygen Demand	389	4071.856
2	Cyanide Total	55	2.734
4a	Ammonia plus Ammonium	205	107.535
4a	Total Kjeldahl Nitrogen	22	335.234
4b	Nitrate+Nitrite	90	115.826
5a	DOC	260	781.720
5b	TOC	17	497.146
6	Total Phosphorus	126	11.424
8	Total Suspended Solids	1011	3244.921
8	Volatile Suspended Solids	4	1351.520
9	Aluminum	470	139.244
9	Beryllium	166	0.002
9	Cadmium	411	0.699
9	Chromium	243	2.690
9	Cobalt	166	0.011
9	Copper	394	1.189
9	Lead	398	9.815
9	Molybdenum	322	1.799
9	Nickel	191	0.066
9	Silver	167	0.065
9	Thallium	12	0.012
9	Vanadium	191	0.077
9	Zinc	470	147.783
10	Antimony	6	0.051
10	Arsenic	6	0.073
10	Selenium	6	0.032
11	Chromium (hexavalent)	22	0.034
12	Mercury	27	0.009
13	Tetra–alkyl lead (Total)	8	1.61E–04
13	Tri–alkyl lead (Total)	8	1.61E–04
14	Phenolics (4AAP)	958	24.119
15	Sulphide	8	0.036
16	1,1–Dichloroethane	12	1.35E–04

ATG = ANALYTICAL TEST GROUP
NLOAD = TOTAL NUMBER OF LOADING OBSERVATIONS IN THE SECTOR
LTA = LONG TERM AVERAGE LOADINGS

TABLE 9 – SECTOR LOADINGS

LONG TERM AVERAGE (LTA) LOADINGS [kg/day]
AT FINAL DISCHARGE POINT
12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

ATG	PARAMETER	NLOAD	LTA
16	Chloroform	8	0.113
16	Methylene Chloride	12	8.31E–04
17	Benzene	11	0.036
17	Toluene	11	0.032
17	o–Xylene	12	7.34E–05
19	Benzobutylphthalate	12	0.132
19	Bis(2–ethylhexyl)phthalate	28	0.196
20	2,4–Dimethylphenol	12	0.545
20	4–Nitrophenol	12	8.37E–04
20	Pentachlorophenol	12	4.05E–04
23	1,2,3–Trichlorobenzene	4	3.62E–06
24	Octachlorodibenzo–p–dioxin	4	3.33E–06
24	Octachlorodibenzofuran	2	2.81E–06
24	Total H6CDD	2	6.00E–09
24	Total H6CDF	2	9.00E–09
24	Total H7CDD	2	1.60E–08
24	Total H7CDF	2	6.00E–09
24	Total PCDF	4	4.34E–06
24	Total TCDF	4	1.07E–05
25	Oil and Grease	594	419.098
26	Abietic Acid	19	1.059
26	Chlorodehydroabietic Acid	12	0.003
26	Dehydroabietic Acid	12	0.004
26	Isopimaric Acid	12	0.003
26	Levopimaric Acid	16	1.258
26	Neoabietic Acid	16	1.259
26	Oleic Acid	12	0.006
26	Pimaric Acid	12	0.003
27	PCBT	12	0.006
MC1	Iron	470	235.921
MC1	Magnesium	470	2468.730
MC2	Fluoride	412	401.663

ATG = ANALYTICAL TEST GROUP
NLOAD = TOTAL NUMBER OF LOADING OBSERVATIONS IN THE SECTOR
LTA = LONG TERM AVERAGE LOADINGS

5.4 Intake Water

The tables and plots in Appendix VI are prepared using the limited amount of intake water loading data provided by the companies (as explained earlier in Section 4.7). When reviewing the tables and plots from Richmond and Haley, one should keep in mind that the intake water data are the result of two and three samples, respectively, while the final discharge loadings are the LTA values calculated using the data from one-year of monitoring. Only General Motors provided more frequent monitoring of intake water (monthly).

Several compounds were found in the intake waters at greater or comparable levels to those in the effluent. The plots illustrate several cases where effluent loadings of a given parameter can be directly attributed to levels in the plant's intake water (i.e. TSS sample at the General Motors' #1000 control point; cadmium, molybdenum and methylene chloride at Haley's control point #0200; magnesium and fluoride at Richmond). The intake water loading data received from Western Foundry is not presented because flow rates were estimated.

5.5 Inspection and Monitoring Data

When the inspection data (one, two or three data points) from the year of monitoring are compared to the LTA concentrations (Appendix VII), it is found that the majority of the inspection data are within the range of the samples collected by industry.

The inspection data collected at the Canada Alloy plant, however, are higher than the monitoring data. The higher concentrations of contaminants are suspected to be due to the contributions from the filter backwash water.

With respect to Chrysler, Franklin Electric and Haley, most results obtained by the MOE are less than the minimum recorded during the monitoring program.

5.6 Toxicity

Of the total of 116 samples tested for Rainbow trout, 33% were non-lethal, 27% had LC50>100% effluent and 40% were lethal. Those tested for Daphnia magna were 35% non-lethal, 24% had LC50>100% effluent and 41% were lethal (LC50<100%).
To find the source of toxicity for these sites, further detailed investigation in the form of Toxicity Identification/Reduction Evaluations are required.

The toxicity results are explained in detail in the report published by the Limnology Section[6].

6.0 COMPARISON OF RESULTS TO PROVINCIAL REQUIREMENTS

This section presents a comparison of the LTA values obtained during the year of monitoring to existing Certificates of Approval (C of A) objectives and guidelines (usually expressed as monthly averages).

The Haley Industries' monitoring results (LTA) for process effluent (final discharge) are compared to their monthly average requirements according to their C of A in the Table 10:

TABLE 10 - HALEY INDUSTRIES - CERTIFICATE OF APPROVAL

Parameter	Certificate of Approval (mg/L)	Monitoring Data LTA Conc. (mg/L)
Total Suspended Solids	4.1	307.4
Oil & Grease	1.37	1.6
Nickel	0.01	0.05
Zinc	0.038	0.85
Copper	0.0035	0.62
Lead	0.0043	0.06
Chromium Total	0.067	0.85
Silver	0.00005	0.39
Aluminum	0.11	2.16
Iron	0.1	408.45
Fluoride	0.65	30.23
Phenolics	0.013	0.04

Haley's LTA concentrations obtained during monitoring in most cases exceed the present C of A values. Current plant modifications are expected to show significant improvements with respect to the concentrations released into the environment.

Ford's monitoring results (LTA) for combined effluent (final discharge) are compared to its guidelines and objectives requirement in Table 11:

TABLE 11 - FORD MOTOR - GUIDELINES AND OBJECTIVES

Parameter	Guidelines/ Objectives (mg/L)	Monitoring Data LTA Conc. (mg/L)
Phenolics	0.020	223.8
Oil & Grease	15.0	2.2

The concentrations of phenolics and Oil & Grease exceeds the existing objectives.

General Motors' monitoring results for its combined effluent (final discharge) are compared to its guidelines requirements in Table 12:

TABLE 12 - GENERAL MOTORS - GUIDELINES

Parameter	Guidelines	Monitoring Data LTA Conc.
Total Suspended Solids (mg/L)	15	13.6
Oil & Grease (μg/L)	20	50.9

With respect to their present guidelines, General Motors exceeds the required concentration of phenolics.

7.0 REFERENCES

1. Ontario Ministry of the Environment (1990). MISA Issue Resolution Process - Issue Resolution Committee Reports, June 1990.

2. Ontario Ministry of the Environment (1992). Candidate Substances List for Bans or Phase-Outs, Toronto, Ontario. ISBN 0-7729-9764-0, April 1992.

3. Results of Pre-Regulation Monitoring of Four Plants in the Metal Casting Sector, Canviro Consultants, 1988.

4. Ontario Ministry of the Environment (1990). The Development Document for the Effluent Monitoring Regulation for the Metal Casting Sector. Toronto, Ontario. ISBN:0-7729-6293-6.

5. Ontario Ministry of the Environment (1992). Quality Assurance and Quality Control Data Analyses for the Municipal/Industrial Strategy for Abatement - Metal Casting Sector, Toronto, Ontario. February, 1993.

6. Ontario Ministry of the Environment (1992). Acute Lethality Data for Ontario's Metal Casting Sector Effluents, covering the period from May 1990 to May 1991, Toronto, Ontario. August 1992.

APPENDIX I

PARAMETER LISTING AND GUIDELINES

PARAMETER LISTING AND GUIDELINES

ATG	PARAMETER	RMDL	PWQO/G	R	IDL	UNIT
1	Chemical Oxygen Demand	10.000				mg/L
2	Cyanide Total	0.005	0.0050	O		mg/L
3	Hydrogen Ion (pH)				5.5 – 9.5	
4a	Ammonia plus Ammonium	0.250			10.000	mg/L
4a	Total Kjeldahl Nitrogen	0.500				mg/L
4b	Nitrate+Nitrite	0.250				mg/L
5a	DOC	0.500				mg/L
5b	TOC	5.000				mg/L
6	Total Phosphorus	0.100				mg/L
7	Specific Conductance	5.000				uS/cm
8	Total Suspended Solids	5.000			15.000	mg/L
8	Volatile Suspended Solids	10.000				mg/L
9	Aluminum	30.000				ug/L
9	Beryllium	10.000				ug/L
9	Cadmium	2.000	0.2000	O	1.000	ug/L
9	Chromium	20.000	100.0000	O	1000.000	ug/L
9	Cobalt	20.000	0.4000	PG		ug/L
9	Copper	10.000	5.0000	O	1000.000	ug/L
9	Lead	30.000	5.0000	PO	1000.000	ug/L
9	Molybdenum	20.000				ug/L
9	Nickel	20.000	25.0000	O	1000.000	ug/L
9	Silver	30.000	0.1000	O		ug/L
9	Thallium	30.000	0.2000	PG		ug/L
9	Vanadium	30.000	7.0000	PG		ug/L
9	Zinc	10.000	16.0000	O	1000.000	ug/L
10	Antimony	5.000	7.0000	PG		ug/L
10	Arsenic	5.000	100.0000	O		ug/L
10	Selenium	5.000	100.0000	O		ug/L
11	Chromium (hexavalent)	10.000				ug/L
12	Mercury	0.100	0.2000	O	1.000	ug/L
13	Tetra–alkyl lead (Total)	2.000				ug/L
13	Tri–alkyl lead (Total)	2.000				ug/L
14	Phenolics (4AAP)	2.000	1.0000	O	20.000	ug/L
15	Sulphide	0.020				mg/L

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
PWQO/G = PROVINCIAL WATER QUALITY OBJECTIVE/GUIDELINE
IDL = INDUSTRIAL DISCHARGE LIMIT
R = REMARK: O – OBJECTIVE, G – GUIDELINE, P – PROPOSED

PARAMETER LISTING AND GUIDELINES

ATG	PARAMETER	RMDL	PWQO/G	R	IDL	UNIT
16	1,1,2,2–Tetrachloroethane	4.300	50.0000	PG		ug/L
16	1,1,2–Trichloroethane	0.600	800.0000	PG		ug/L
16	1,1–Dichloroethane	0.800	200.0000	PG		ug/L
16	1,1–Dichloroethylene	2.800	40.0000	PG		ug/L
16	1,2–Dichlorobenzene	1.400	2.5000	O		ug/L
16	1,2–Dichloroethane	0.800	90.0000	PG		ug/L
16	1,2–Dichloropropane	0.900				ug/L
16	1,3–Dichlorobenzene	1.100	2.5000	O		ug/L
16	1,4–Dichlorobenzene	1.700	4.0000	O		ug/L
16	Bromoform	3.700				ug/L
16	Bromomethane	3.700				ug/L
16	Carbon Tetrachloride	1.300				ug/L
16	Chlorobenzene	0.700	15.0000	O		ug/L
16	Chloroform	0.700				ug/L
16	Chloromethane	3.700				ug/L
16	Cis–1,3–Dichloropropylene	1.400				ug/L
16	Dibromochloromethane	1.100				ug/L
16	Ethylene Dibromide	1.000				ug/L
16	Methylene Chloride	1.300				ug/L
16	Tetrachloroethylene	1.100	50.0000	PG		ug/L
16	Trans–1,2–Dichloroethylene	1.400	200.0000	PG		ug/L
16	Trans–1,3–Dichloropropylen	1.400				ug/L
16	Trichloroethylene	1.900	2.0000	PG		ug/L
16	Trichlorofluoromethane	1.000				ug/L
16	Vinyl Chloride	4.000				ug/L
17	Benzene	0.500	100.0000	PG		ug/L
17	Styrene	0.500	20.0000	PG		ug/L
17	Toluene	0.500	0.8000			ug/L
17	m–Xylene and p–Xylene	1.100				ug/L
17	o–Xylene	0.500	0.7000	PG		ug/L
18	Acrolein	4.000				ug/L
18	Acrylonitrile	4.200				ug/L
19	1–Chloronaphthalene	2.500				ug/L
19	1–Methylnaphthalene	3.200	2.0000	PG		ug/L

ATG = ANALYTICAL TEST GROUP
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R = REMARK: O – OBJECTIVE, G – GUIDELINE, P – PROPOSED

PARAMETER LISTING AND GUIDELINES

ATG	PARAMETER	RMDL	PWQO/G	R	IDL	UNIT
19	2,4–Dinitrotoluene	0.800	5.0000	PG		ug/L
19	2,6–Dinitrotoluene	0.700	50.0000	PG		ug/L
19	2–Chloronaphthalene	1.800				ug/L
19	2–Methylnaphthalene	2.200	2.0000	PG		ug/L
19	4–Bromophenyl Phenyl Ether	0.300				ug/L
19	4–Chlorophenyl Phenyl Ether	0.900				ug/L
19	5–Nitro, Acenaphthene	4.300				ug/L
19	Acenaphthene	1.300				ug/L
19	Acenaphthylene	1.400				ug/L
19	Anthracene	1.200				ug/L
19	Benzo(a)anthracene	0.500				ug/L
19	Benzo(a)pyrene	0.600				ug/L
19	Benzo(b)fluoranthene	0.700				ug/L
19	Benzo(g,h,i)perylene	0.700				ug/L
19	Benzo(k)fluoranthene	0.700				ug/L
19	Benzobutylphthalate	0.600				ug/L
19	Biphenyl	0.600				ug/L
19	Bis(2–chloroethoxyl)methane	3.500				ug/L
19	Bis(2–chloroethyl)ether	4.400				ug/L
19	Bis(2–chloroisopropyl)ether	2.200				ug/L
19	Bis(2–ethylhexyl)phthalate	2.200	0.6000	O		ug/L
19	Camphene	3.500				ug/L
19	Chrysene	0.300				ug/L
19	Di–n–butyl Phthalate	3.800	4.0000	O		ug/L
19	Dibenz(a,h)anthracene	1.300				ug/L
19	Diphenyl Ether	0.400				ug/L
19	Diphenylamine	14.000				ug/L
19	Fluoranthene	0.400				ug/L
19	Fluorene	1.700				ug/L
19	Indeno(1,2,3–cd)pyrene	1.300				ug/L
19	Indole	1.900				ug/L
19	N–Nitrosodi–n–propylamine	3.100				ug/L
19	N–Nitrosodiphenylamine	14.000				ug/L
19	Naphthalene	1.600				ug/L

ATG = ANALYTICAL TEST GROUP
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R = REMARK: O – OBJECTIVE, G – GUIDELINE, P – PROPOSED

PARAMETER LISTING AND GUIDELINES

ATG	PARAMETER	RMDL	PWQO/G	R	IDL	UNIT
19	Perylene	1.500				ug/L
19	Phenanthrene	0.400				ug/L
19	Pyrene	0.400				ug/L
20	2,3,4,5–Tetrachlorophenol	0.400	1.0000	O		ug/L
20	2,3,4,6–Tetrachlorophenol	2.800	1.0000	O		ug/L
20	2,3,4–Trichlorophenol	0.600	18.0000	O		ug/L
20	2,3,5,6–Tetrachlorophenol	1.600	1.0000	O		ug/L
20	2,3,5–Trichlorophenol	1.300	18.0000	O		ug/L
20	2,4,5–Trichlorophenol	1.300	18.0000	O		ug/L
20	2,4,6–Trichlorophenol	1.300	18.0000	O		ug/L
20	2,4–Dichlorophenol	1.700	0.2000	O		ug/L
20	2,4–Dimethylphenol	7.300	10.5000	PG		ug/L
20	2,4–Dinitrophenol	42.000				ug/L
20	2,6–Dichlorophenol	2.000	0.2000	O		ug/L
20	2–Chlorophenol	3.700				ug/L
20	4,6–Dinitro–o–cresol	24.000	0.2000	PG		ug/L
20	4–Chloro–3–methylphenol	1.500				ug/L
20	4–Nitrophenol	1.400	48.0000	PG		ug/L
20	Pentachlorophenol	1.300	0.5000	O		ug/L
20	Phenol	2.400	5.0000	O		ug/L
20	m–Cresol	3.400	1.0000	PG		ug/L
20	o–Cresol	3.700	1.0000	PG		ug/L
20	p–Cresol	3.500	1.0000	PG		ug/L
23	1,2,3,4–Tetrachlorobenzene	0.010	0.1000	O		ug/L
23	1,2,3,5–Tetrachlorobenzene	0.010	0.1000	O		ug/L
23	1,2,3–Trichlorobenzene	0.010	0.9000	O		ug/L
23	1,2,4,5–Tetrachlorobenzene	0.010	0.1500	O		ug/L
23	1,2,4–Trichlorobenzene	0.010	0.5000	O		ug/L
23	2,4,5–Trichlorotoluene	0.010				ug/L
23	Hexachlorobenzene	0.010	0.0065	O		ug/L
23	Hexachlorobutadiene	0.010	0.0200	PG		ug/L
23	Hexachlorocyclopentadiene	0.010				ug/L
23	Hexachloroethane	0.010				ug/L
23	Octachlorostyrene	0.010				ug/L

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
PWQO/G = PROVINCIAL WATER QUALITY OBJECTIVE/GUIDELINE
IDL = INDUSTRIAL DISCHARGE LIMIT
R = REMARK: O – OBJECTIVE, G – GUIDELINE, P – PROPOSED

PARAMETER LISTING AND GUIDELINES

ATG	PARAMETER	RMDL	PWQO/G	R	IDL	UNIT
23	Pentachlorobenzene	0.010	0.0300	O		ug/L
24	2,3,7,8 TCDD	0.020	0.0001	PG		ng/L
24	Octachlorodibenzo-p-dioxin	0.030				ng/L
24	Octachlorodibenzofuran	0.030				ng/L
24	Total H6CDD	0.030				ng/L
24	Total H6CDF	0.020				ng/L
24	Total H7CDD	0.030				ng/L
24	Total H7CDF	0.030				ng/L
24	Total PCDD	0.020				ng/L
24	Total PCDF	0.015				ng/L
24	Total TCDD	0.020				ng/L
24	Total TCDF	0.015				ng/L
25	Oil and Grease	1.000			15.000	mg/L
26	Abietic Acid	0.005				mg/L
26	Chlorodehydroabietic Acid	0.005				mg/L
26	Dehydroabietic Acid	0.005				mg/L
26	Isopimaric Acid	0.005				mg/L
26	Levopimaric Acid	0.005				mg/L
26	Neoabietic Acid	0.005				mg/L
26	Oleic Acid	0.005				mg/L
26	Pimaric Acid	0.005				mg/L
27	PCBT	0.100	0.0010	O		ug/L
MC1	Iron	0.020	0.3000	O		mg/L
MC1	Magnesium	0.020				mg/L
MC2	Fluoride	0.100				mg/L

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APPENDIX II

LIST OF THE REMARK CODES

LIST OF REMARK CODES

REMARK CODE	DESCRIPTION
<	Actual amount less than reported
<DL	Reported value = MDL :measured amount MDL (non-zero)
<T	A measurable trace amount: interpret with caution
<W	No measurable response (zero): reported value
?	Late data: data not yet available
A	Approximate value
AIS	Approximate value: insufficient sample
AR	Attached Report
I	Interference suspected
IB	Interference: background
N/A or !	No data will be reported
OLD	Old: sample exceeds maximum storage time
SD	Sample duplicates differ in appearance
SIP	Sample improperly preserved
UCR	Data unreliable: could not confirm by reanalysis
UQC	Data unreliable: possible lab QC problem
!IN	No data: insufficient volume due to inspection
!NM	No effluent - no sample available
<SQ	Less than based on semi-quantitative method
P60	PCB resembled AROCLAR 1260
SFA	Sample filtered, filtrate analysed
SQT	Result based on semi-quantitative method
UIN	Unreliable: indeterminate interference
!RO	See attached report, no numerical data
!TC	Total ratio Cr:Pb < 1.0 ppm

APPENDIX III

LONG TERM AVERAGE CONCENTRATIONS

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

CANADA ALLOY CASTING LTD., KITCHENER

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
3	Hydrogen Ion (pH)			12	100	7.783	7.783	7.783
5a	DOC	0.500	mg/L	12	100	1.500	1.500	1.500
8	Total Suspended Solids	5.000	mg/L	12	8	2.750	4.250	4.833
9	Aluminum	30.000	ug/L	12	66	39.500	40.633	44.500
9	Cadmium	2.000	ug/L	12	33	1.958	2.042	2.125
9	Copper	10.000	ug/L	12	50	12.042	12.042	12.042
9	Zinc	10.000	ug/L	12	91	17.791	17.791	17.791
25	Oil and Grease	1.000	mg/L	11	63	2.533	2.620	2.896
MC1	Iron	0.020	mg/L	12	100	0.109	0.109	0.109
MC1	Magnesium	0.020	mg/L	12	100	30.297	30.297	30.297
MC2	Fluoride	0.100	mg/L	12	100	0.254	0.254	0.254

ATG = ANALYTICAL TEST GROUP

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LTA = LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

CANADA PIPE COMPANY LTD., HAMILTON

CONTROL POINT 0100 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	4	100	282.750	282.750	282.750
2	Cyanide Total	0.005	mg/L	4	100	0.424	0.424	0.424
3	Hydrogen Ion (pH)			42	100	7.990	7.990	7.990
4a	Ammonia plus Ammonium	0.250	mg/L	4	75	3.060	3.060	3.060
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	15.400	15.400	15.400
4b	Nitrate+Nitrite	0.250	mg/L	4	100	4.055	4.055	4.055
5a	DOC	0.500	mg/L	12	100	70.100	70.100	70.100
5b	TOC	5.000	mg/L	3	100	94.667	94.667	94.667
6	Total Phosphorus	0.100	mg/L	4	100	0.520	0.520	0.520
7	Specific Conductance	5.000	uS/cm	4	100	13167.500	13167.500	13167.500
8	Total Suspended Solids	5.000	mg/L	42	92	1479.057	1479.157	1479.176
9	Aluminum	30.000	ug/L	12	100	5550.417	5550.417	5550.417
9	Cadmium	2.000	ug/L	12	100	2274.333	2274.333	2274.333
9	Chromium	20.000	ug/L	12	66	549.250	549.250	549.250
9	Copper	10.000	ug/L	12	100	1973.583	1973.583	1973.583
9	Lead	30.000	ug/L	12	100	30421.833	30421.833	30421.833
9	Molybdenum	20.000	ug/L	12	83	185.583	185.833	187.250
9	Nickel	20.000	ug/L	12	50	184.917	188.667	193.250
9	Zinc	10.000	ug/L	12	100	313133.333	313133.333	313133.333
10	Antimony	5.000	ug/L	4	100	51.000	51.000	51.000
10	Arsenic	5.000	ug/L	4	75	13.250	13.250	13.250
10	Selenium	5.000	ug/L	4	50	49.500	51.000	52.000
12	Mercury	0.100	ug/L	4	75	0.847	0.847	0.847
13	Tri-alkyl lead (Total)	2.000	ug/L	8	37	0.750	1.375	2.000
13	Tetra-alkyl lead (Total)	2.000	ug/L	8	37	0.750	1.375	2.000
14	Phenolics (4AAP)	2.000	ug/L	42	100	73.214	73.214	73.214
15	Sulphide	0.020	mg/L	4	100	0.095	0.095	0.095
19	Bis(2-ethylhexyl)phthalate	2.200	ug/L	4	50	1.425	2.125	2.525
25	Oil and Grease	1.000	mg/L	41	85	7.109	7.180	7.182
MC1	Iron	0.020	mg/L	12	100	334.433	334.433	334.433
MC1	Magnesium	0.020	mg/L	12	100	60.267	60.267	60.267
MC2	Fluoride	0.100	mg/L	12	100	25.433	25.433	25.433

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

CHRYSLER CANADA LTD., ETOBICOKE

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
3	Hydrogen Ion (pH)			12	100	7.124	7.124	7.124
5a	DOC	0.500	mg/L	12	100	35.893	35.893	35.893
8	Total Suspended Solids	5.000	mg/L	12	16	5.183	5.183	5.183
9	Aluminum	30.000	ug/L	12	91	122.333	122.333	122.333
9	Cadmium	2.000	ug/L	12	41	5.442	5.692	5.942
9	Chromium	20.000	ug/L	13	38	17.923	21.000	24.077
9	Copper	10.000	ug/L	12	91	22.417	22.417	22.417
9	Lead	30.000	ug/L	12	33	19.167	22.500	29.167
9	Nickel	20.000	ug/L	12	33	21.667	24.167	26.667
9	Vanadium	30.000	ug/L	13	53	32.308	40.000	43.846
9	Zinc	10.000	ug/L	12	75	57.083	57.083	57.083
25	Oil and Grease	1.000	mg/L	12	50	2.075	2.075	2.075
MC1	Iron	0.020	mg/L	12	91	0.067	0.067	0.067
MC1	Magnesium	0.020	mg/L	12	100	12.052	12.052	12.052
MC2	Fluoride	0.100	mg/L	12	100	0.921	0.921	0.921

ATG = ANALYTICAL TEST GROUP

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N = NUMBER OF OBSERVATIONS

FD (%) = FREQUENCY OF DETECTION (PERCENT)

LTA = LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

MINIMUM LTA = MINIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT 0100 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	156	69	18.397	18.397	18.397
2	Cyanide Total	0.005	mg/L	12	50	0.021	0.023	0.024
3	Hydrogen Ion (pH)			364	100	7.023	7.023	7.023
4a	Ammonia plus Ammonium	0.250	mg/L	12	66	0.253	0.256	0.274
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	1.137	1.137	1.137
4b	Nitrate+Nitrite	0.250	mg/L	12	100	0.796	0.796	0.796
5a	DOC	0.500	mg/L	52	100	3.402	3.402	3.402
5b	TOC	5.000	mg/L	4	75	5.750	5.750	5.750
7	Specific Conductance	5.000	uS/cm	364	100	324.538	324.538	324.538
8	Total Suspended Solids	5.000	mg/L	364	85	13.497	13.503	13.525
8	Volatile Suspended Solids	10.000	mg/L	4	50	16.425	16.425	16.425
9	Aluminum	30.000	ug/L	156	98	817.756	817.885	818.141
9	Cadmium	2.000	ug/L	156	31	2.571	3.256	3.942
9	Copper	10.000	ug/L	156	19	12.756	12.756	12.756
9	Lead	30.000	ug/L	156	59	49.936	53.590	60.897
9	Molybdenum	20.000	ug/L	156	50	24.167	24.167	24.167
9	Zinc	10.000	ug/L	156	99	893.397	893.397	893.397
12	Mercury	0.100	ug/L	12	33	0.108	0.108	0.108
14	Phenolics (4AAP)	2.000	ug/L	360	93	223.836	223.836	223.836
17	Benzene	0.500	ug/L	11	36	0.436	0.464	0.573
17	Toluene	0.500	ug/L	11	45	0.382	0.409	0.609
19	Benzobutylphthalate	0.600	ug/L	12	66	1.683	1.683	1.683
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	33	1.600	2.475	2.883
20	2,4–Dimethylphenol	7.300	ug/L	12	33	6.583	6.827	9.017
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	50	0.030	0.040	0.045
24	Octachlorodibenzofuran	0.030	ng/L	2	50	0.025	0.035	0.040
24	Total PCDF	0.015	ng/L	2	50	0.046	0.051	0.054
24	Total TCDF	0.015	ng/L	2	100	0.128	0.128	0.128
25	Oil and Grease	1.000	mg/L	156	46	2.196	2.196	2.196
27	PCBT	0.100	ug/L	12	33	0.071	0.074	0.088
MC1	Iron	0.020	mg/L	156	98	0.599	0.599	0.599
MC1	Magnesium	0.020	mg/L	156	100	9.161	9.161	9.161
MC2	Fluoride	0.100	mg/L	156	99	4.506	4.506	4.506

METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

FORD MOTOR COMPANY OF CANADA, WINDSOR
CONTROL POINT 0300 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	151	70	19.596	19.596	19.596
2	Cyanide Total	0.005	mg/L	12	58	0.046	0.047	0.048
3	Hydrogen Ion (pH)			354	100	6.421	6.421	6.421
4a	Ammonia plus Ammonium	0.250	mg/L	12	91	0.534	0.535	0.534
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	1.220	1.220	1.220
4b	Nitrate+Nitrite	0.250	mg/L	12	100	0.832	0.832	0.832
5a	DOC	0.500	mg/L	50	100	3.834	3.834	3.834
5b	TOC	5.000	mg/L	4	100	8.100	8.100	8.100
7	Specific Conductance	5.000	uS/cm	354	100	302.209	302.209	302.209
8	Total Suspended Solids	5.000	mg/L	354	93	18.653	18.655	18.667
8	Volatile Suspended Solids	10.000	mg/L	4	50	16.165	16.165	16.165
9	Aluminum	30.000	ug/L	151	99	1599.470	1599.536	1599.669
9	Cadmium	2.000	ug/L	151	54	6.563	7.020	7.477
9	Copper	10.000	ug/L	151	48	19.735	19.735	19.735
9	Lead	30.000	ug/L	151	70	127.417	130.000	135.166
9	Zinc	10.000	ug/L	151	100	2025.232	2025.232	2025.232
12	Mercury	0.100	ug/L	12	33	0.125	0.125	0.125
14	Phenolics (4AAP)	2.000	ug/L	349	93	543.083	543.083	543.083
17	Benzene	0.500	ug/L	11	72	1.064	1.073	1.109
17	Styrene	0.500	ug/L	11	36	0.600	0.742	0.873
17	Toluene	0.500	ug/L	11	63	0.673	0.678	0.718
19	1–Methylnaphthalene	3.200	ug/L	12	41	3.008	3.075	3.542
19	2–Methylnaphthalene	2.200	ug/L	12	50	2.308	2.375	2.675
19	Benzobutylphthalate	0.600	ug/L	12	75	4.358	4.358	4.358
19	Biphenyl	0.600	ug/L	12	33	0.733	0.733	0.733
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	50	2.875	3.625	3.975

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT 0300 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
19	Di–n–butyl Phthalate	3.800	ug/L	12	41	3.283	4.250	4.550
19	Fluoranthene	0.400	ug/L	12	41	0.417	0.467	0.517
19	Naphthalene	1.600	ug/L	50	58	1.854	1.994	2.302
19	Phenanthrene	0.400	ug/L	50	74	1.620	1.620	1.620
20	2,4–Dimethylphenol	7.300	ug/L	12	91	30.917	30.977	31.525
20	Phenol	2.400	ug/L	12	91	594.167	594.217	594.367
20	m–Cresol	3.400	ug/L	12	91	17.958	18.025	18.242
20	o–Cresol	3.700	ug/L	12	91	131.167	131.267	131.475
20	p–Cresol	3.500	ug/L	12	91	35.250	35.342	35.542
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	100	0.065	0.065	0.065
24	Octachlorodibenzofuran	0.030	ng/L	2	50	0.045	0.055	0.060
24	Total H6CDF	0.020	ng/L	2	50	0.010	0.015	0.020
24	Total TCDF	0.015	ng/L	2	100	0.070	0.070	0.070
25	Oil and Grease	1.000	mg/L	151	46	2.003	2.003	2.003
27	PCBT	0.100	ug/L	12	58	0.122	0.123	0.130
MC1	Iron	0.020	mg/L	151	99	1.169	1.169	1.169
MC1	Magnesium	0.020	mg/L	151	100	9.373	9.373	9.373
MC2	Fluoride	0.100	mg/L	151	98	8.268	8.268	8.268

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT 0500 – EMERGENCY OVERFLOW

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	4	100	23.500	23.500	23.500
3	Hydrogen Ion (pH)			4	100	7.050	7.050	7.050
8	Total Suspended Solids	5.000	mg/L	4	100	19.250	19.250	19.250
14	Phenolics (4AAP)	2.000	ug/L	4	100	208.250	208.250	208.250
19	Phenanthrene	0.400	ug/L	4	50	0.475	0.475	0.475
25	Oil and Grease	1.000	mg/L	4	100	5.000	5.000	5.000
27	PCBT	0.100	ug/L	4	50	0.078	0.087	0.127
MC1	Iron	0.020	mg/L	4	100	2.177	2.177	2.177
MC1	Magnesium	0.020	mg/L	4	100	8.662	8.662	8.662
MC2	Fluoride	0.100	mg/L	4	100	4.425	4.425	4.425

ATG = ANALYTICAL TEST GROUP

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N = NUMBER OF OBSERVATIONS

FD (%) = FREQUENCY OF DETECTION (PERCENT)

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

FRANKLIN ELECTRIC OF CANADA, STRATHROY

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	5	100	29.576	29.576	29.576
3	Hydrogen Ion (pH)			14	100	7.723	7.723	7.723
4a	Ammonia plus Ammonium	0.250	mg/L	5	80	0.276	0.276	0.276
4a	Total Kjeldahl Nitrogen	0.500	mg/L	5	80	13.934	13.934	13.934
4b	Nitrate+Nitrite	0.250	mg/L	5	100	1.768	1.768	1.768
5a	DOC	0.500	mg/L	14	100	67.140	67.140	67.140
5b	TOC	5.000	mg/L	5	100	61.414	61.414	61.414
6	Total Phosphorus	0.100	mg/L	5	60	0.402	0.422	0.442
7	Specific Conductance	5.000	uS/cm	5	100	738.800	738.800	738.800
8	Total Suspended Solids	5.000	mg/L	14	64	19.343	19.343	19.343
9	Aluminum	30.000	ug/L	14	100	158.571	158.571	158.571
9	Cadmium	2.000	ug/L	14	57	5.029	5.243	5.457
9	Nickel	20.000	ug/L	14	57	28.571	30.714	32.857
9	Thallium	30.000	ug/L	14	50	34.286	35.714	36.429
9	Vanadium	30.000	ug/L	14	28	17.143	28.571	34.286
9	Zinc	10.000	ug/L	14	71	27.429	27.429	27.429
11	Chromium (hexavalent)	10.000	ug/L	14	42	21.956	23.242	26.242
25	Oil and Grease	1.000	mg/L	14	42	1.821	1.821	1.821
26	Abietic Acid	0.005	mg/L	5	60	0.023	0.023	0.023
MC1	Iron	0.020	mg/L	14	100	0.243	0.243	0.243
MC1	Magnesium	0.020	mg/L	14	100	60.719	60.719	60.719
MC2	Fluoride	0.100	mg/L	5	100	0.538	0.538	0.538

ATG = ANALYTICAL TEST GROUP

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FD (%) = FREQUENCY OF DETECTION (PERCENT)

LTA = LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

MINIMUM LTA = MINIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

GENERAL MOTORS OF CANADA, ST. CATHARINES

CONTROL POINT 0900 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	153	73	17.582	18.634	19.085
2	Cyanide Total	0.005	mg/L	12	50	0.007	0.007	0.008
3	Hydrogen Ion (pH)			342	100	7.980	7.980	7.980
4a	Ammonia plus Ammonium	0.250	mg/L	12	91	1.069	1.069	1.069
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	2.035	2.035	2.035
4b	Nitrate+Nitrite	0.250	mg/L	10	90	0.441	0.461	0.466
5a	DOC	0.500	mg/L	51	100	3.212	3.212	3.212
7	Specific Conductance	5.000	uS/cm	339	100	358.776	358.776	358.776
8	Total Suspended Solids	5.000	mg/L	344	40	8.189	8.863	9.875
9	Aluminum	30.000	ug/L	153	99	660.200	660.216	660.200
9	Cadmium	2.000	ug/L	153	24	2.408	2.675	2.892
9	Chromium	20.000	ug/L	154	15	27.323	27.781	31.479
9	Lead	30.000	ug/L	153	60	53.366	55.706	58.268
9	Zinc	10.000	ug/L	153	99	661.174	661.180	661.174
14	Phenolics (4AAP)	2.000	ug/L	343	92	77.642	77.690	77.741
16	Chloroform	0.700	ug/L	12	41	0.858	0.858	0.858
17	Benzene	0.500	ug/L	12	75	0.883	0.950	0.967
17	Toluene	0.500	ug/L	12	50	0.675	0.675	0.675
17	m–Xylene and p–Xylene	1.100	ug/L	12	33	1.258	1.925	1.992
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	33	3.883	4.883	5.350
20	2,4–Dimethylphenol	7.300	ug/L	12	50	20.558	21.017	23.600
20	Phenol	2.400	ug/L	12	33	5.392	5.992	6.992
20	m–Cresol	3.400	ug/L	12	41	5.867	6.333	7.850
20	o–Cresol	3.700	ug/L	12	58	29.250	29.483	30.483
20	p–Cresol	3.500	ug/L	12	41	5.883	6.350	7.925
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	50	0.020	0.025	0.035
25	Oil and Grease	1.000	mg/L	151	54	1.428	1.428	1.428
26	Abietic Acid	0.005	mg/L	12	50	0.007	0.007	0.007
26	Levopimaric Acid	0.005	mg/L	12	66	0.008	0.008	0.008
26	Neoabietic Acid	0.005	mg/L	12	83	0.009	0.009	0.009
MC1	Iron	0.020	mg/L	153	100	0.728	0.728	0.728
MC1	Magnesium	0.020	mg/L	153	100	9.124	9.124	9.124
MC2	Fluoride	0.100	mg/L	12	100	0.279	0.279	0.279

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

GENERAL MOTORS OF CANADA, ST. CATHARINES

CONTROL POINT 1000 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	52	78	17.962	19.173	19.692
2	Cyanide Total	0.005	mg/L	12	50	0.004	0.005	0.005
3	Hydrogen Ion (pH)			151	100	7.959	7.959	7.959
4a	Ammonia plus Ammonium	0.250	mg/L	12	91	0.560	0.560	0.560
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	1.627	1.627	1.627
4b	Nitrate+Nitrite	0.250	mg/L	3	66	0.403	0.403	0.403
5a	DOC	0.500	mg/L	52	98	3.025	3.033	3.035
6	Total Phosphorus	0.100	mg/L	52	21	0.078	0.082	0.115
7	Specific Conductance	5.000	uS/cm	151	100	350.199	350.199	350.199
8	Total Suspended Solids	5.000	mg/L	152	50	13.059	13.625	14.474
9	Aluminum	30.000	ug/L	52	100	537.500	537.500	537.500
9	Cadmium	2.000	ug/L	52	19	1.450	1.852	2.181
9	Chromium	20.000	ug/L	52	19	15.602	16.190	21.371
9	Lead	30.000	ug/L	52	28	23.538	29.154	33.923
9	Zinc	10.000	ug/L	52	100	386.685	386.685	386.685
14	Phenolics (4AAP)	2.000	ug/L	152	94	50.903	50.943	50.982
16	Chloroform	0.700	ug/L	4	50	0.800	0.800	0.800
25	Oil and Grease	1.000	mg/L	152	66	1.751	1.751	1.751
26	Abietic Acid	0.005	mg/L	4	50	0.007	0.007	0.007
26	Levopimaric Acid	0.005	mg/L	4	75	0.009	0.009	0.009
26	Neoabietic Acid	0.005	mg/L	4	75	0.009	0.009	0.009
MC1	Iron	0.020	mg/L	52	100	0.665	0.665	0.665
MC1	Magnesium	0.020	mg/L	52	100	9.524	9.524	9.524
MC2	Fluoride	0.100	mg/L	4	100	0.217	0.217	0.217

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0100 – COMBINED EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	155	100	216.676	216.676	216.676
3	Hydrogen Ion (pH)			254	100	7.784	7.784	7.784
4a	Ammonia plus Ammonium	0.250	mg/L	155	58	5.243	5.331	5.343
5a	DOC	0.500	mg/L	53	100	16.028	16.028	16.028
6	Total Phosphorus	0.100	mg/L	52	98	2.019	2.019	2.019
8	Total Suspended Solids	5.000	mg/L	253	98	93.243	93.279	93.302
16	1,1–Dichloroethane	0.800	ug/L	4	50	1.950	2.050	2.350
16	Methylene Chloride	1.300	ug/L	4	75	8.725	8.775	9.050
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	4	100	26.075	26.075	26.075
20	4–Nitrophenol	1.400	ug/L	4	100	5.000	5.000	5.000
20	Pentachlorophenol	1.300	ug/L	4	100	2.025	2.025	2.025
20	Phenol	2.400	ug/L	4	50	6.350	6.432	6.950
25	Oil and Grease	1.000	mg/L	154	20	1.281	1.380	1.391

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0200 – PROCESS EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	158	100	404.203	404.203	404.203
2	Cyanide Total	0.005	mg/L	12	100	1.011	1.011	1.011
3	Hydrogen Ion (pH)			363	100	9.098	9.098	9.098
4a	Ammonia plus Ammonium	0.250	mg/L	158	97	32.163	32.167	32.168
4a	Total Kjeldahl Nitrogen	0.500	mg/L	2	100	29.010	29.010	29.010
4b	Nitrate+Nitrite	0.250	mg/L	52	90	28.572	28.574	28.596
5a	DOC	0.500	mg/L	52	100	36.119	36.119	36.119
5b	TOC	5.000	mg/L	2	100	29.260	29.260	29.260
6	Total Phosphorus	0.100	mg/L	51	100	1.991	1.991	1.991
7	Specific Conductance	5.000	uS/cm	356	100	3569.758	3569.758	3569.758
8	Total Suspended Solids	5.000	mg/L	361	99	307.399	307.407	307.413
9	Aluminum	30.000	ug/L	155	100	2163.632	2163.632	2163.632
9	Beryllium	10.000	ug/L	155	34	7.942	9.226	12.265
9	Cadmium	2.000	ug/L	155	63	5.275	5.902	5.972
9	Chromium	20.000	ug/L	155	98	850.548	850.548	850.548
9	Cobalt	20.000	ug/L	155	67	43.406	43.406	43.406
9	Copper	10.000	ug/L	155	99	624.710	624.768	624.774
9	Lead	30.000	ug/L	155	67	59.645	63.935	68.161
9	Molybdenum	20.000	ug/L	154	34	17.312	27.831	29.000
9	Nickel	20.000	ug/L	155	47	49.677	49.677	49.677
9	Silver	30.000	ug/L	155	88	394.200	395.265	397.103
9	Vanadium	30.000	ug/L	155	43	63.742	64.129	64.323
9	Zinc	10.000	ug/L	155	100	845.903	845.903	845.903
10	Antimony	5.000	ug/L	2	100	164.000	164.000	164.000
10	Arsenic	5.000	ug/L	2	100	286.000	286.000	286.000

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0200 – PROCESS EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
10	Selenium	5.000	ug/L	2	100	100.500	100.500	100.500
12	Mercury	0.100	ug/L	11	81	4.791	4.791	4.791
14	Phenolics (4AAP)	2.000	ug/L	360	55	44.343	44.343	44.343
16	1,1–Dichloroethane	0.800	ug/L	12	41	0.792	0.900	1.125
16	Methylene Chloride	1.300	ug/L	12	66	4.760	4.793	4.977
17	o–Xylene	0.500	ug/L	12	33	0.274	0.392	0.566
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	75	7.433	7.500	7.800
20	4–Nitrophenol	1.400	ug/L	12	91	4.700	4.700	4.700
20	Pentachlorophenol	1.300	ug/L	12	91	2.292	2.292	2.292
23	1,2,3–Trichlorobenzene	0.010	ug/L	4	50	0.017	0.017	0.017
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	100	0.610	0.610	0.610
24	Total H6CDD	0.030	ng/L	2	50	0.020	0.030	0.036
24	Total H6CDF	0.020	ng/L	2	50	0.046	0.046	0.046
24	Total H7CDD	0.030	ng/L	2	50	0.067	0.079	0.082
24	Total H7CDF	0.030	ng/L	2	50	0.020	0.033	0.036
24	Total PCDF	0.015	ng/L	2	50	0.017	0.017	0.017
24	Total TCDF	0.015	ng/L	2	50	0.007	0.013	0.015
25	Oil and Grease	1.000	mg/L	156	39	1.520	1.578	1.584
26	Abietic Acid	0.005	mg/L	11	100	0.016	0.016	0.016
26	Chlorodehydroabietic Acid	0.005	mg/L	12	100	0.017	0.017	0.017
26	Dehydroabietic Acid	0.005	mg/L	12	100	0.022	0.022	0.022
26	Isopimaric Acid	0.005	mg/L	12	100	0.017	0.017	0.017
26	Levopimaric Acid	0.005	mg/L	12	100	0.017	0.017	0.017
26	Neoabietic Acid	0.005	mg/L	12	100	0.020	0.020	0.020
26	Pimaric Acid	0.005	mg/L	12	100	0.016	0.016	0.016
26	Oleic Acid	0.005	mg/L	12	100	0.032	0.032	0.032
MC1	Iron	0.020	mg/L	155	100	408.455	408.455	408.455
MC1	Magnesium	0.020	mg/L	155	100	3259.098	3259.098	3259.098
MC2	Fluoride	0.100	mg/L	155	100	30.234	30.234	30.234

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0300 – STORM WATER EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	12	100	92.833	92.833	92.833
2	Cyanide Total	0.005	mg/L	12	50	0.385	0.387	0.387
4a	Ammonia plus Ammonium	0.250	mg/L	12	50	24.309	24.364	24.372
4b	Nitrate+Nitrite	0.250	mg/L	12	100	2.337	2.337	2.337
5a	DOC	0.500	mg/L	12	100	7.787	7.787	7.787
6	Total Phosphorus	0.100	mg/L	12	50	0.099	0.137	0.141
8	Total Suspended Solids	5.000	mg/L	12	100	178.917	178.917	178.917
9	Aluminum	30.000	ug/L	12	91	1650.000	1650.000	1650.000
9	Beryllium	10.000	ug/L	12	33	8.250	9.750	13.250
9	Chromium	20.000	ug/L	12	66	31.667	31.667	31.667
9	Cobalt	20.000	ug/L	12	58	35.000	35.000	35.000
9	Copper	10.000	ug/L	12	75	19.167	21.417	21.667
9	Lead	30.000	ug/L	12	50	37.083	44.583	52.083
9	Vanadium	30.000	ug/L	12	50	61.667	61.667	61.667
9	Zinc	10.000	ug/L	12	91	306.250	307.000	307.083
14	Phenolics (4AAP)	2.000	ug/L	12	66	43.085	43.100	43.085
25	Oil and Grease	1.000	mg/L	12		0.842	0.917	0.925
MC1	Iron	0.020	mg/L	12	100	150.344	150.344	150.344
MC1	Magnesium	0.020	mg/L	12	100	49.967	49.967	49.967
MC2	Fluoride	0.100	mg/L	12	91	8.969	8.972	8.977

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LONG TERM AVERAGE (LTA) CONCENTRATIONS

KUBOTA METAL, FAHRAMET DIV., ORILLIA
CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
1	Chemical Oxygen Demand	10.000	mg/L	4	75	30.500	32.750	33.000
2	Cyanide Total	0.005	mg/L	4	75	0.009	0.009	0.009
3	Hydrogen Ion (pH)			12	100	8.167	8.167	8.167
4a	Ammonia plus Ammonium	0.250	mg/L	4	100	1.370	1.370	1.370
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	1.898	1.898	1.898
4b	Nitrate+Nitrite	0.250	mg/L	4	100	0.673	0.673	0.673
5a	DOC	0.500	mg/L	12	100	5.194	5.194	5.194
5b	TOC	5.000	mg/L	4	75	7.800	7.800	7.800
6	Total Phosphorus	0.100	mg/L	4	50	0.090	0.098	0.115
7	Specific Conductance	5.000	uS/cm	4	100	395.250	395.250	395.250
8	Total Suspended Solids	5.000	mg/L	12	100	25.667	25.667	25.667
9	Aluminum	30.000	ug/L	12	100	405.417	405.417	405.417
9	Copper	10.000	ug/L	12	66	17.250	18.250	20.583
9	Silver	30.000	ug/L	12	41	28.750	30.833	41.250
9	Zinc	10.000	ug/L	12	50	15.083	16.417	18.417
14	Phenolics (4AAP)	2.000	ug/L	12	66	6.958	6.958	6.958
15	Sulphide	0.020	mg/L	4	50	0.057	0.057	0.057
16	Chloroform	0.700	ug/L	4	50	1.250	1.400	1.600
25	Oil and Grease	1.000	mg/L	12	58	3.033	3.033	3.033
MC1	Iron	0.020	mg/L	12	100	0.168	0.168	0.168
MC1	Magnesium	0.020	mg/L	12	100	9.023	9.023	9.023
MC2	Fluoride	0.100	mg/L	12	83	0.158	0.158	0.158

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METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

RICHMOND DIE CASTING LTD., CORNWALL
CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
3	Hydrogen Ion (pH)			12	100	8.107	8.107	8.107
5a	DOC	0.500	mg/L	11	100	6.591	6.591	6.591
8	Total Suspended Solids	5.000	mg/L	12	33	9.833	11.208	12.333
9	Aluminum	30.000	ug/L	12	83	79.667	79.667	79.667
9	Zinc	10.000	ug/L	12	75	18.751	19.333	20.417
11	Chromium (hexavalent)	10.000	ug/L	10	50	12.100	13.650	17.100
25	Oil and Grease	1.000	mg/L	12	41	2.750	2.750	2.750
MC1	Iron	0.020	mg/L	12	100	0.099	0.099	0.099
MC1	Magnesium	0.020	mg/L	12	100	7.827	7.827	7.827
MC2	Fluoride	0.100	mg/L	12	91	0.132	0.132	0.132

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
N = NUMBER OF OBSERVATIONS
FD (%) = FREQUENCY OF DETECTION (PERCENT)
LTA = LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition
MINIMUM LTA = MINIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition
MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

WESTERN FOUNDRY CO. LTD., WINGHAM

CONTROL POINT 0100 – COOLING WATER (ARTHUR STREET)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
3	Hydrogen Ion (pH)			11	100	7.864	7.864	7.864
5a	DOC	0.500	mg/L	11	100	0.891	0.891	0.891
8	Total Suspended Solids	5.000	mg/L	11		2.545	4.182	4.818
9	Aluminum	30.000	ug/L	12	91	71.208	71.208	71.208
9	Copper	10.000	ug/L	12	41	9.117	9.117	9.117
9	Zinc	10.000	ug/L	12	83	43.108	43.108	43.108
14	Phenolics (4AAP)	2.000	ug/L	11	72	6.636	6.855	7.182
25	Oil and Grease	1.000	mg/L	10	60	2.160	2.233	2.460
MC1	Iron	0.020	mg/L	12	100	0.270	0.270	0.270
MC1	Magnesium	0.020	mg/L	12	100	24.124	24.124	24.124
MC2	Fluoride	0.100	mg/L	11	100	0.920	0.920	0.920

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

FD (%) = FREQUENCY OF DETECTION (PERCENT)

LTA = LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

MINIMUM LTA = MINIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) CONCENTRATIONS

WESTERN FOUNDRY CO. LTD., WINGHAM

CONTROL POINT 0200 – COOLING WATER (CNR BRIDGE)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	MINIMUM LTA	LTA	MAXIMUM LTA
3	Hydrogen Ion (pH)			12	100	7.808	7.808	7.808
5a	DOC	0.500	mg/L	11	81	1.218	1.218	1.218
8	Total Suspended Solids	5.000	mg/L	11	36	5.545	6.527	6.909
9	Aluminum	30.000	ug/L	12	91	182.833	182.833	182.833
9	Copper	10.000	ug/L	12	33	10.083	10.083	10.083
9	Zinc	10.000	ug/L	12	83	41.200	41.200	41.200
14	Phenolics (4AAP)	2.000	ug/L	11	45	5.727	6.164	6.818
25	Oil and Grease	1.000	mg/L	10	50	5.350	5.469	5.850
MC1	Iron	0.020	mg/L	12	100	0.727	0.727	0.727
MC1	Magnesium	0.020	mg/L	12	100	22.450	22.450	22.450
MC2	Fluoride	0.100	mg/L	11	100	0.888	0.888	0.888

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

FD (%) = FREQUENCY OF DETECTION (PERCENT)

LTA = LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

MINIMUM LTA = MINIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE CONCENTRATION – See section 4.4 for definition

APPENDIX IV

DISCHARGE FLOWS

METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 to 30 APRIL 1991

MONTHLY AVERAGE OF DAILY DISCHARGE FLOWS [m3/day]

PLANT	MONTH												ANNUAL
	MAY 90	JUN 90	JUL 90	AUG 90	SEP 90	OCT 90	NOV 90	DEC 90	JAN 91	FEB 91	MAR 91	APR 91	AVERAGE
CANADA ALLOY CASTING LTD. # 0100 – Cooling Water	203	196	205	186	220	250	147	118	173	252	162	141	188
CANADA PIPE COMPANY LTD. # 0100 – Combined Effluent	113	267	219	118	53	93	50	213	95	19	8	49	115
CHRYSLER CANADA LTD. # 0100 – Cooling Water	1584	2008	1748	1688	2104	1392	1432	1000	1304	1224	868	1456	1484
FORD MOTOR COMPANY # 0300 – Process Effluent	35102	35852	25341	34827	28456	31389	32797	19502	29804	28181	26323	28560	29760
FORD MOTOR COMPANY # 0100 – Combined Effluent (final)	79801	81147	66405	83697	74637	83010	78213	55484	71403	69307	67326	72633	73590
FRANKLIN ELECTRIC OF CANADA #0100 –Cooling Water	242	218	236	227	201	228	287	283	346	426	247	378	277
GENERAL MOTORS OF CANADA # 0900 – Process Effluent	81712	85456	77746	63339	79547	77471	80207	54497	70566	61916	75907	83022	72180
GENERAL MOTORS OF CANADA # 1000 – Combined Effluent (final)	162418	161166	162897	156758	153485	143279	120240	101850	114344	109300	114951	124844	135627

METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 to 30 APRIL 1991

MONTHLY AVERAGE OF DAILY DISCHARGE FLOWS [m3/day]

PLANT	MONTH												ANNUAL
	MAY 90	JUN 90	JUL 90	AUG 90	SEP 90	OCT 90	NOV 90	DEC 90	JAN 91	FEB 91	MAR 91	APR 91	AVERAGE
HALEY INDUSTRIES LTD. # 0600 – Wastewater Effluent	0	22	22	12	12	6	7	11	12	13	10	13	13
HALEY INDUSTRIES LTD. # 0100 – Combined Effluent	62	67	66	51	50	46	44	40	49	49	47	46	52
HALEY INDUSTRIES LTD. # 0200 – Process Effluent (final)	168	184	234	123	115	103	95	69	92	99	108	152	129
HALEY INDUSTRIES LTD. # 0300 – Stormwater Effluent	109	131	66	11	0	110	105	97	0	115	92	248	107
KUBOTA METAL, FAHRAMET DIV. #0100 –Cooling Water	271	820	820	263	135	377	504	179	263	271	238	179	360
RICHMOND DIE CASTING LTD. # 0100 – Cooling Water	1950	1766	2060	2060	1913	2232	2232	2011	2060	1674	2060	1786	1984
WESTERN FOUNDRY CO. LTD. # 0100 – Cooling Water	525	290	315	249	358	584	247	413	271	434	328	429	370
WESTERN FOUNDRY CO. LTD. # 0200 – Cooling Water	1380	966	3650	2880	1780	26	29	29	17	29	58	209	921

METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 to 30 APRIL 1991

MONTHLY AVERAGE OF DAILY INTAKE FLOWS [m3/day]

PLANT	MONTH												ANNUAL
	MAY 90	JUN 90	JUL 90	AUG 90	SEP 90	OCT 90	NOV 90	DEC 90	JAN 91	FEB 91	MAR 91	APR 91	AVERAGE
GENERAL MOTORS OF CANADA Control Point 0200	156353	153842	154601	147204	146613	135368	113753	97510	105348	104456	105764	118941	128313

ANNUAL AVERAGE OF DAILY INTAKE FLOWS [m3/day]

PLANT	FLOW
FORD MOTOR COMPANY OF CANADA, WINDSOR Control Point 0200	72,000.0
HALEY INDUSTRIES LTD., HALEY Control Point 0400	145.0

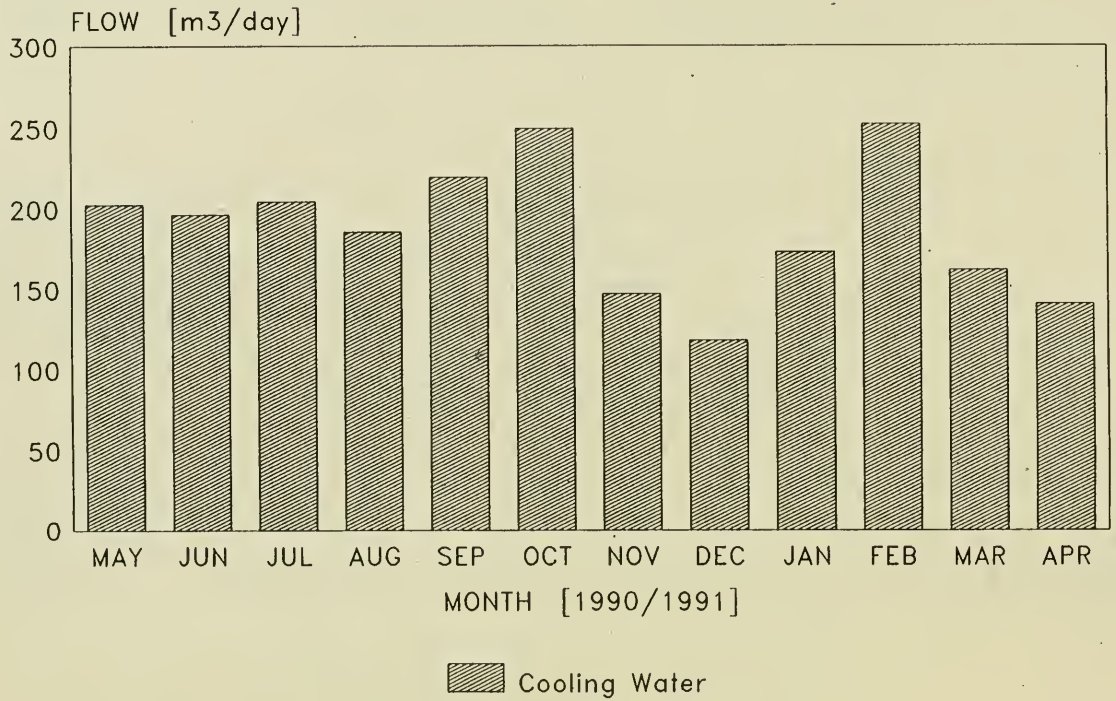
PLANT	FLOW
RICHMOND DIE CASTING LTD., CORNMALL Control Point 0200	2,166.0
WESTERN FOUNDARY CO. LTD., WINGHAM Control Point 0300	1,673.1

EVENT ORIENTED FLOWS – TOTAL VOLUME DISCHARGED AND DISCHARGE DURATION

PLANT	VOLUME DISCHARGED	DISCHARGE DURATION
FORD MOTOR COMPANY OF CANADA, WINDSOR Control Point 0500 – Emergency Overflow	1703 m3	2.7 hours

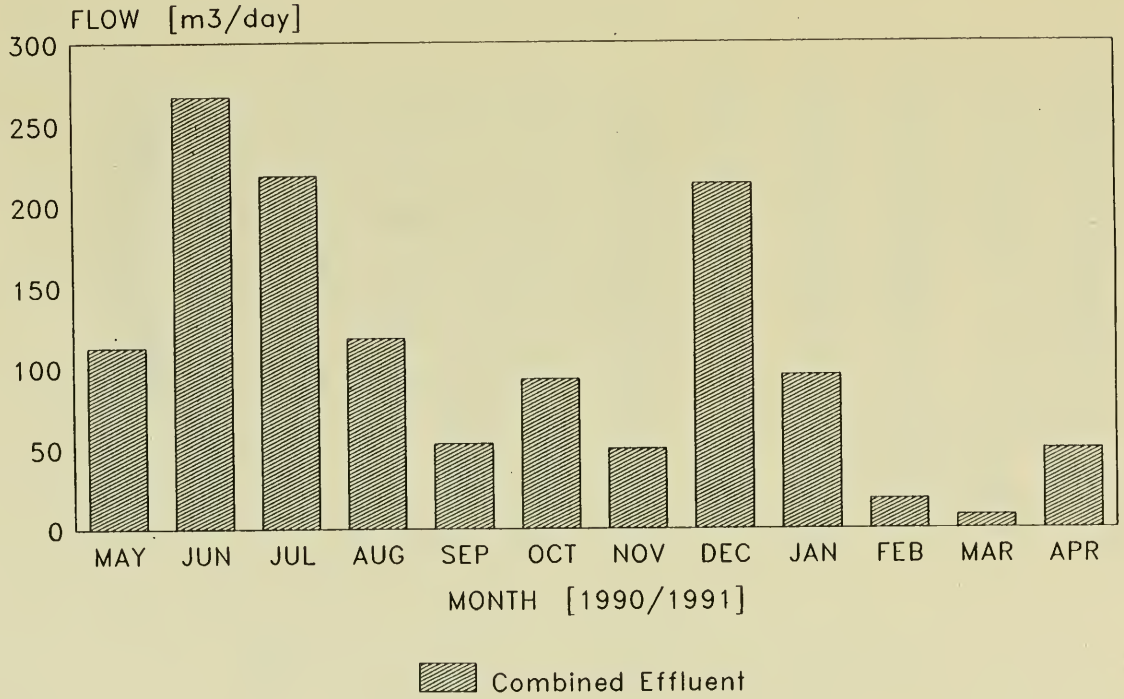
MONTHLY AVERAGE OF DAILY FLOWS

Canada Alloy Casting Ltd.



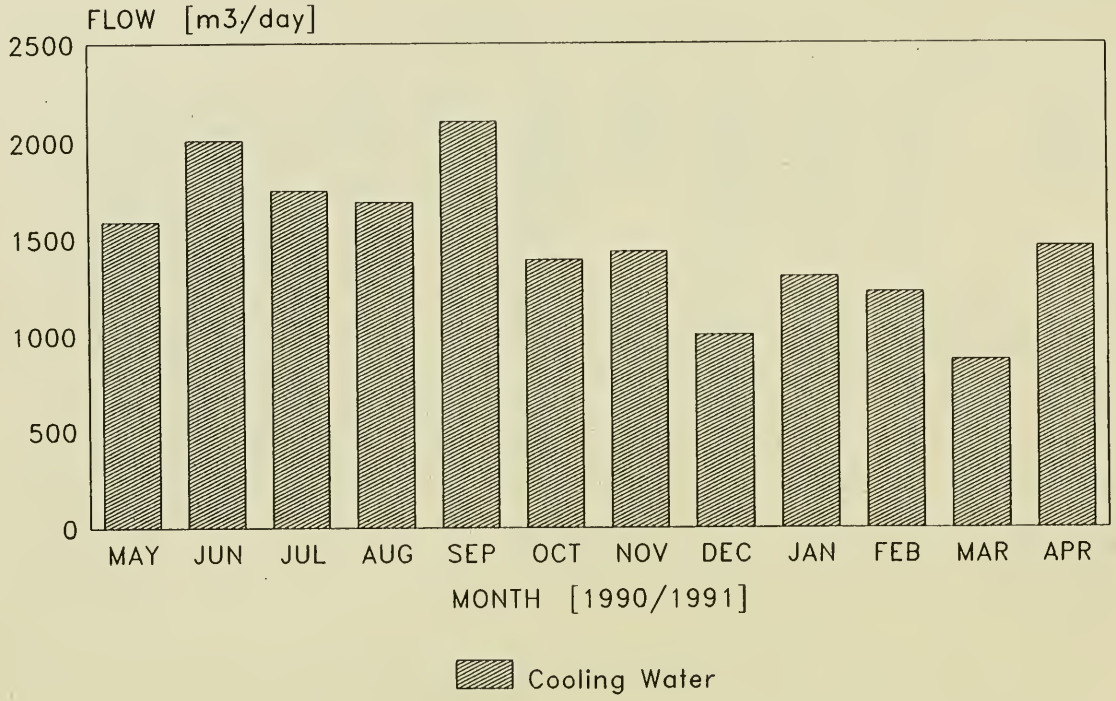
MONTHLY AVERAGE OF DAILY FLOWS

Canada Pipe Company Ltd.



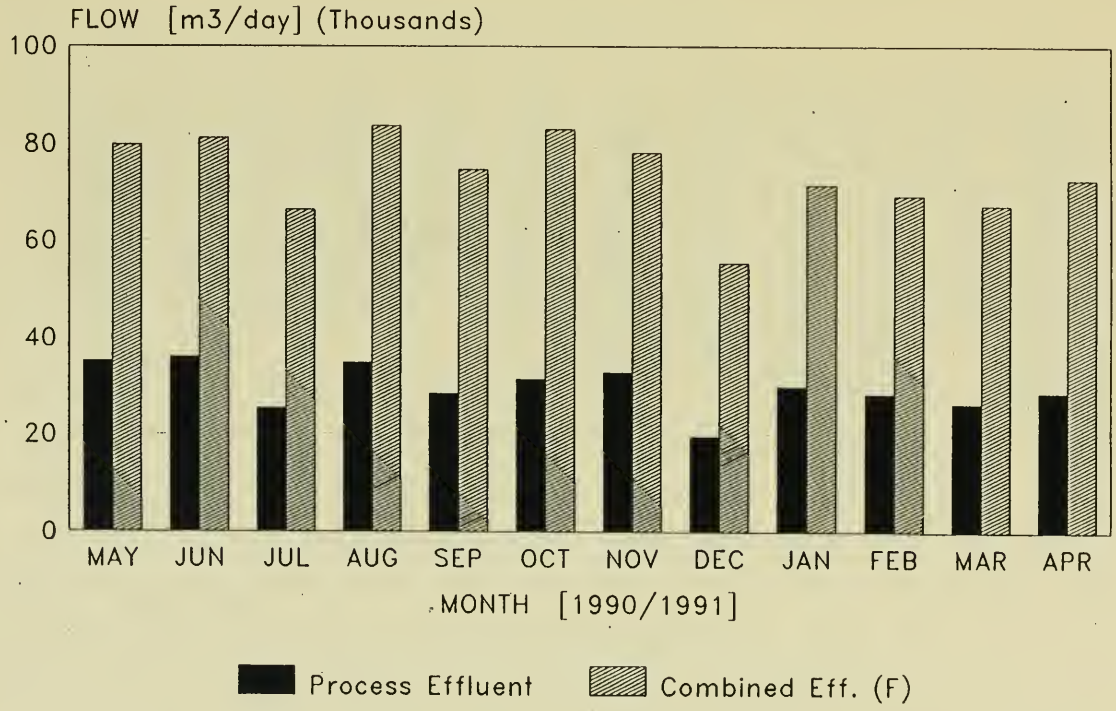
MONTHLY AVERAGE OF DAILY FLOWS

Chrysler Canada Ltd.



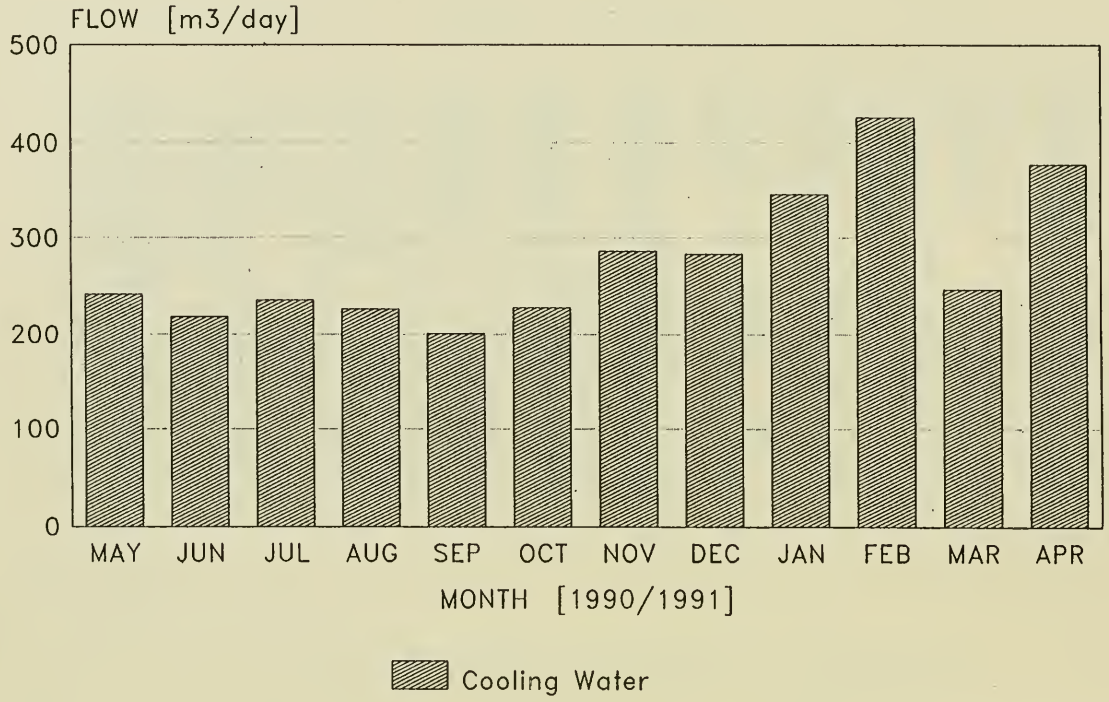
MONTHLY AVERAGE OF DAILY FLOWS

Ford Motor Company of Canada



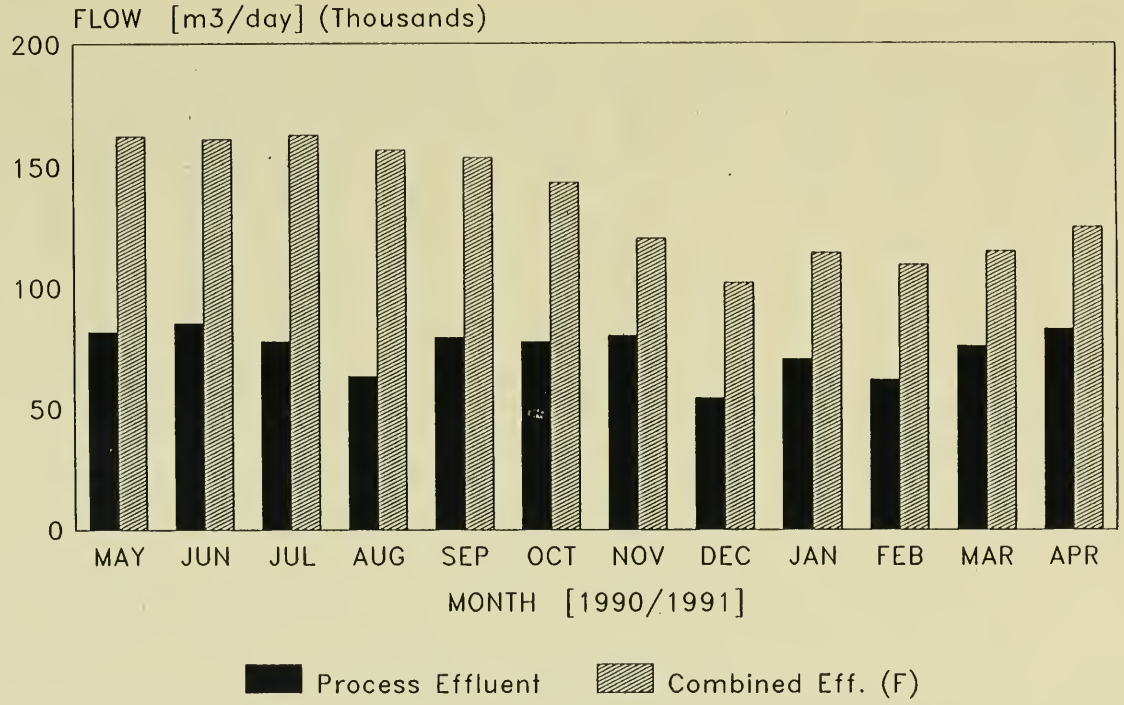
MONTHLY AVERAGE OF DAILY FLOWS

Franklin Electric of Canada



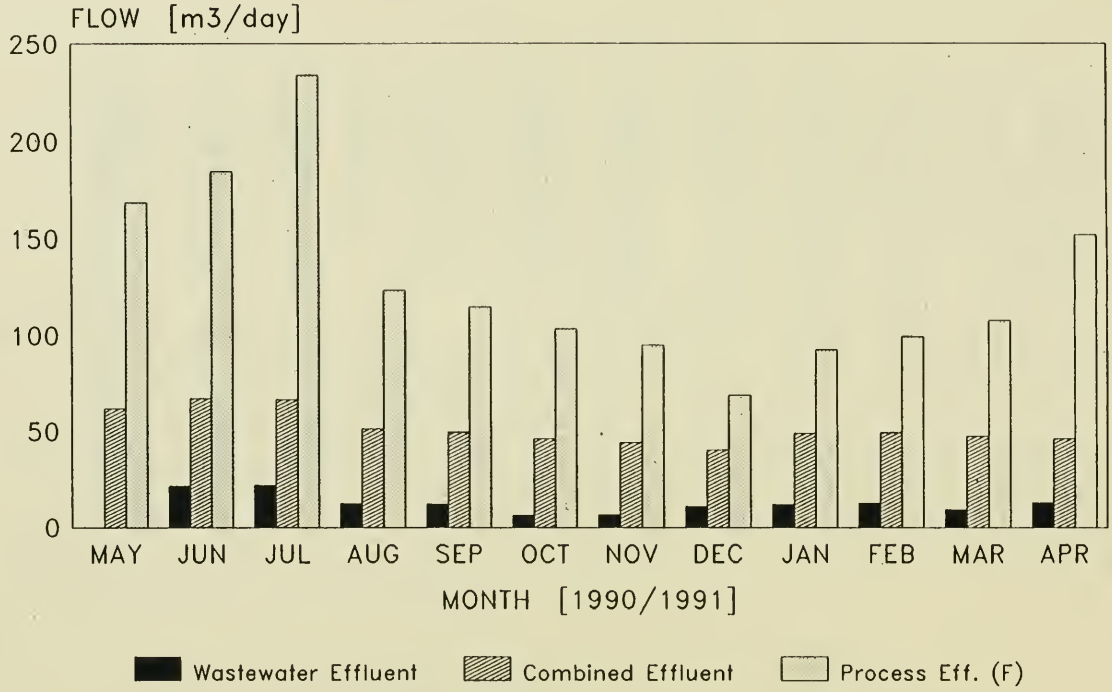
MONTHLY AVERAGE OF DAILY FLOWS

General Motors of Canada



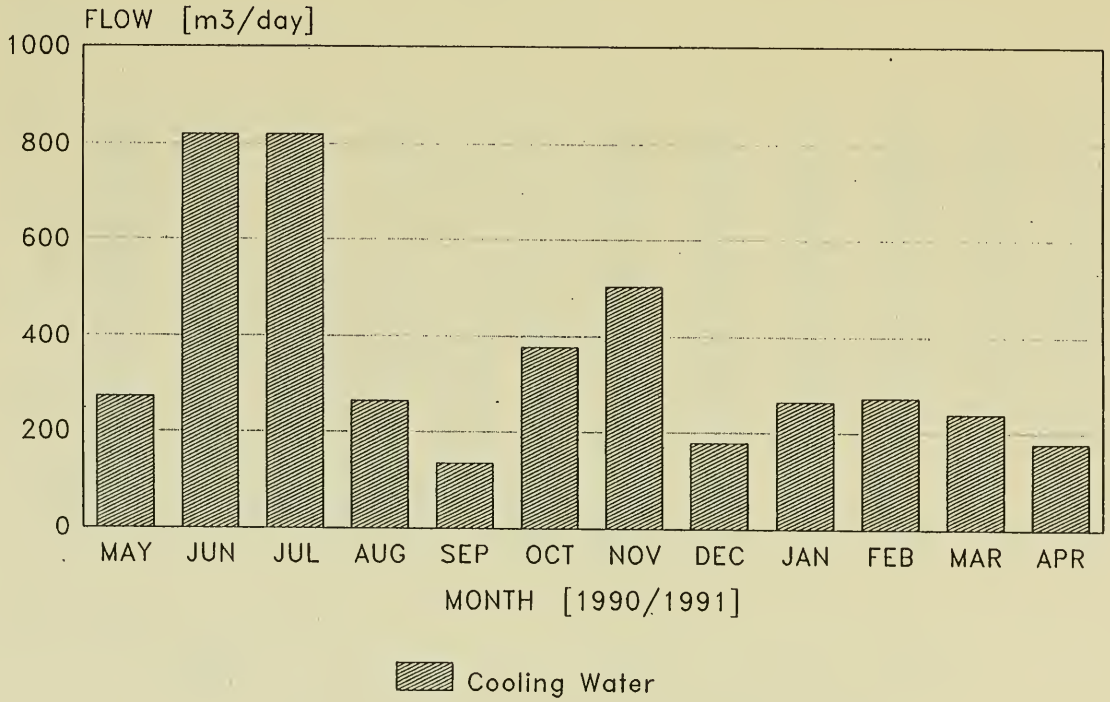
MONTHLY AVERAGE OF DAILY FLOWS

Haley Industries Ltd.



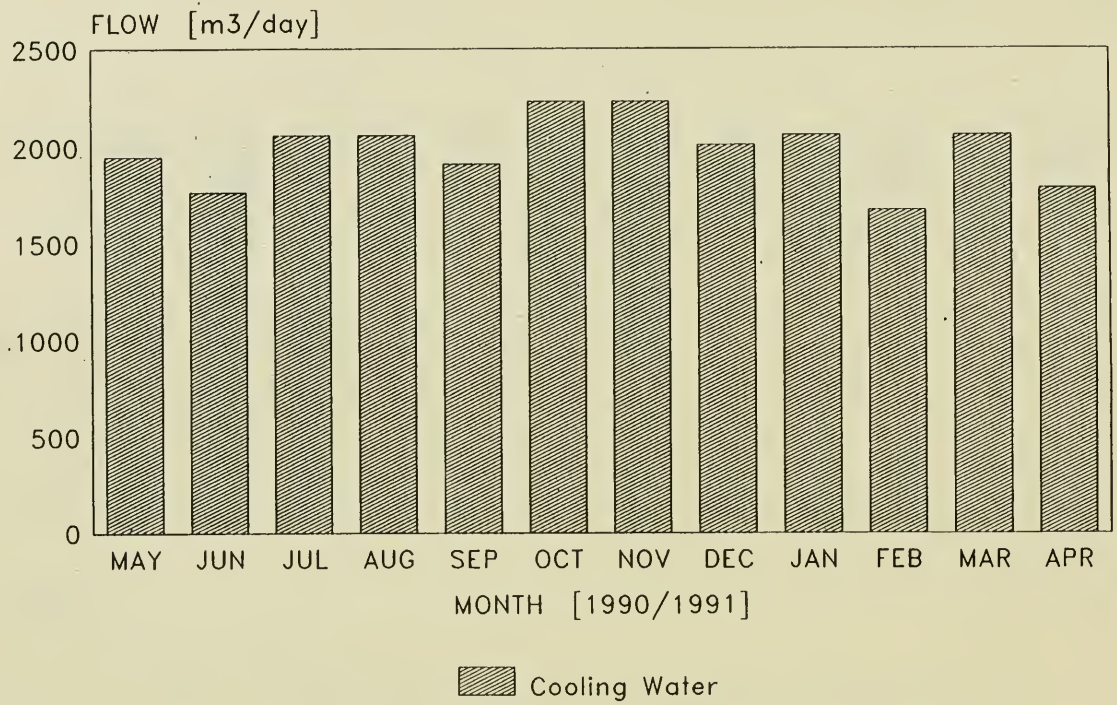
MONTHLY AVERAGE OF DAILY FLOWS

Kubota Metal, Fahramet Div.

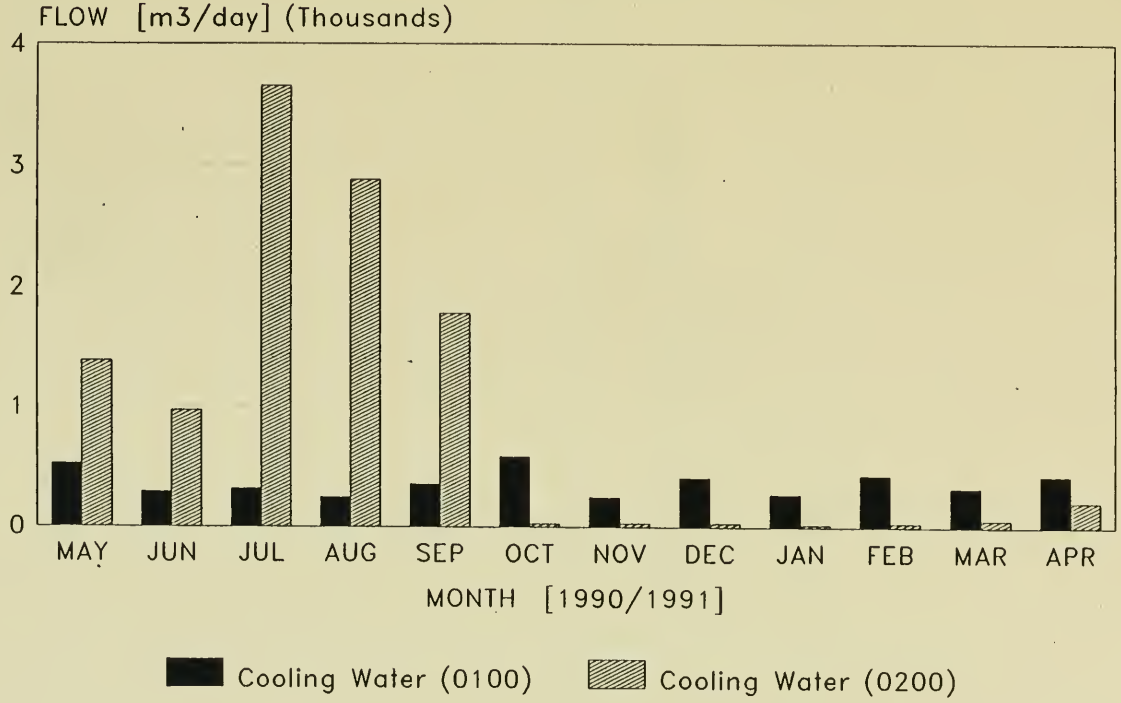


MONTHLY AVERAGE OF DAILY FLOWS

Richmond Die Casting Ltd.



MONTHLY AVERAGE OF DAILY FLOWS
Western Foundry Co. Ltd.



APPENDIX V

LONG TERM AVERAGE LOADINGS

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

CANADA ALLOY CASTING LTD., KITCHENER

CONTROL POINT: 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
5a	DOC	0.500	mg/L	12	100	12	0.290	0.290	0.290	
8	Total Suspended Solids	5.000	mg/L	12	8	12	0.527	0.807	0.915	
9	Aluminum	30.000	ug/L	12	66	12	0.007	0.008	0.008	
9	Cadmium	2.000	ug/L	12	33	12	0.370	0.386	0.403	g
9	Copper	10.000	ug/L	12	50	12	0.002	0.002	0.002	
9	Zinc	10.000	ug/L	12	91	12	0.180	0.180	0.180	
25	Oil and Grease	1.000	mg/L	11	63	11	0.533	0.549	0.599	
MC1	Iron	0.020	mg/L	12	100	12	0.021	0.021	0.021	
MC1	Magnesium	0.020	mg/L	12	100	12	5.665	5.665	5.665	
MC2	Fluoride	0.100	mg/L	12	100	12	0.048	0.048	0.048	

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
N = NUMBER OF OBSERVATIONS
FD(%) = FREQUENCY OF DETECTION (PERCENT)
NLOAD = NUMBER OF LOADING OBSERVATIONS
LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

CANADA PIPE COMPANY LTD., HAMILTON

CONTROL POINT: 0100 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	4	100	4	21.007	21.007	21.007	
2	Cyanide Total	0.005	mg/L	4	100	4	0.010	0.010	0.010	
4a	Ammonia plus Ammonium	0.250	mg/L	4	75	4	0.443	0.443	0.443	
Q	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	4	0.966	0.966	0.966	
4b	Nitrate+Nitrite	0.250	mg/L	4	100	4	0.271	0.271	0.271	
5a	DOC	0.500	mg/L	12	100	12	2.482	2.482	2.482	
5b	TOC	5.000	mg/L	3	100	3	5.486	5.486	5.486	
6	Total Phosphorus	0.100	mg/L	4	100	4	0.074	0.074	0.074	
8	Total Suspended Solids	5.000	mg/L	42	92	41	71.652	71.665	71.668	
9	Aluminum	30.000	ug/L	12	100	12	0.507	0.507	0.507	
9	Cadmium	2.000	ug/L	12	100	12	0.176	0.176	0.176	
9	Chromium	20.000	ug/L	12	66	12	0.029	0.029	0.029	
9	Copper	10.000	ug/L	12	100	12	0.107	0.107	0.107	
9	Lead	30.000	ug/L	12	100	12	1.446	1.446	1.446	
9	Molybdenum	20.000	ug/L	12	83	12	0.009	0.009	0.009	
9	Nickel	20.000	ug/L	12	50	12	0.012	0.012	0.012	
9	Zinc	10.000	ug/L	12	100	12	22.468	22.468	22.468	
10	Antimony	5.000	ug/L	4	100	4	0.010	0.010	0.010	
10	Arsenic	5.000	ug/L	4	75	4	0.003	0.003	0.003	
10	Selenium	5.000	ug/L	4	50	4	0.006	0.006	0.007	
12	Mercury	0.100	ug/L	4	75	4	0.180	0.180	0.180	g
13	Tri–alkyl lead (Total)	2.000	ug/L	8	37	8	0.087	0.161	0.235	g
13	Tetra–alkyl lead (Total)	2.000	ug/L	8	37	8	0.087	0.161	0.235	g
14	Phenolics (4AAP)	2.000	ug/L	42	100	41	0.003	0.003	0.003	
15	Sulphide	0.020	mg/L	4	100	4	0.017	0.017	0.017	
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	4	50	4	0.099	0.274	0.375	g
25	Oil and Grease	1.000	mg/L	41	85	40	1.072	1.075	1.075	
MC1	Iron	0.020	mg/L	12	100	12	17.372	17.372	17.372	
MC1	Magnesium	0.020	mg/L	12	100	12	5.473	5.473	5.473	
MC2	Fluoride	0.100	mg/L	12	100	12	1.368	1.368	1.368	

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
N = NUMBER OF OBSERVATIONS
FD(%) = FREQUENCY OF DETECTION (PERCENT)
NLOAD = NUMBER OF LOADING OBSERVATIONS
LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

CHRYSLER CANADA LTD., ETOBICOKE

CONTROL POINT: 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
5a	DOC	0.500	mg/L	12	100	12	51.912	51.912	51.912	
8	Total Suspended Solids	5.000	mg/L	12	16	12	7.710	7.710	7.710	
9	Aluminum	30.000	ug/L	12	91	12	0.191	0.191	0.191	
9	Cadmium	2.000	ug/L	12	41	12	0.009	0.010	0.010	
9	Chromium	20.000	ug/L	13	38	13	0.023	0.028	0.033	
9	Copper	10.000	ug/L	12	91	12	0.034	0.034	0.034	
9	Lead	30.000	ug/L	12	33	12	0.026	0.032	0.043	
9	Nickel	20.000	ug/L	12	33	12	0.036	0.039	0.042	
9	Vanadium	30.000	ug/L	13	53	13	0.040	0.053	0.060	
9	Zinc	10.000	ug/L	12	75	12	0.083	0.083	0.083	
25	Oil and Grease	1.000	mg/L	12	50	12	3.079	3.079	3.079	
MC1	Iron	0.020	mg/L	12	91	12	0.102	0.102	0.102	
MC1	Magnesium	0.020	mg/L	12	100	12	17.630	17.630	17.630	
MC2	Fluoride	0.100	mg/L	12	100	12	1.372	1.372	1.372	

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
N = NUMBER OF OBSERVATIONS
FD(%) = FREQUENCY OF DETECTION (PERCENT)
NLOAD = NUMBER OF LOADING OBSERVATIONS
LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT: 0100 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	156	69	156	1361.521	1361.521	1361.521	
2	Cyanide Total	0.005	mg/L	12	50	12	1.708	1.821	1.897	
4a	Ammonia plus Ammonium	0.250	mg/L	12	66	12	20.468	20.581	21.413	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	4	89.087	89.087	89.087	
4b	Nitrate+Nitrite	0.250	mg/L	12	100	12	61.085	61.085	61.085	
5a	DOC	0.500	mg/L	52	100	52	257.401	257.401	257.401	
5b	TOC	5.000	mg/L	4	75	4	456.191	456.191	456.191	
8	Total Suspended Solids	5.000	mg/L	364	85	364	1020.834	1021.260	1022.966	
8	Volatile Suspended Solids	10.000	mg/L	4	50	4	1351.520	1351.520	1351.520	
9	Aluminum	30.000	ug/L	156	98	156	63.642	63.650	63.666	
9	Cadmium	2.000	ug/L	156	31	156	0.200	0.249	0.299	
9	Copper	10.000	ug/L	156	19	156	0.939	0.939	0.939	
9	Lead	30.000	ug/L	156	59	156	3.968	4.203	4.674	
9	Molybdenum	20.000	ug/L	156	50	156	1.785	1.785	1.785	
9	Zinc	10.000	ug/L	156	99	156	71.567	71.567	71.567	
12	Mercury	0.100	ug/L	12	33	12	0.008	0.008	0.008	
14	Phenolics (4AAP)	2.000	ug/L	360	93	360	17.603	17.603	17.603	
17	Benzene	0.500	ug/L	11	36	11	0.034	0.036	0.044	
17	Toluene	0.500	ug/L	11	45	11	0.030	0.032	0.047	
19	Benzobutylphthalate	0.600	ug/L	12	66	12	0.132	0.132	0.132	
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	33	12	0.128	0.195	0.226	
20	2,4–Dimethylphenol	7.300	ug/L	12	33	12	0.528	0.545	0.704	
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	50	2	0.002	0.003	0.004	g
24	Octachlorodibenzofuran	0.030	ng/L	2	50	2	0.002	0.003	0.003	g
24	Total PCDF	0.015	ng/L	2	50	2	0.004	0.004	0.005	g
24	Total TCDF	0.015	ng/L	2	100	2	0.011	0.011	0.011	g
25	Oil and Grease	1.000	mg/L	156	46	156	164.428	164.428	164.428	
27	PCBT	0.100	ug/L	12	33	12	0.005	0.006	0.007	
MC1	Iron	0.020	mg/L	156	98	156	46.365	46.365	46.365	
MC1	Magnesium	0.020	mg/L	156	100	156	677.220	677.220	677.220	
MC2	Fluoride	0.100	mg/L	156	99	156	360.648	360.648	360.648	

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

FD(%) = FREQUENCY OF DETECTION (PERCENT)

NLOAD = NUMBER OF LOADING OBSERVATIONS

LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions

MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition

MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition

R = REMARK g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT: 0300 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	151	70	151	598.475	598.475	598.475	
2	Cyanide Total	0.005	mg/L	12	58	12	1.520	1.558	1.583	
4a	Ammonia plus Ammonium	0.250	mg/L	12	91	12	18.025	18.029	18.025	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	4	41.891	41.891	41.891	
4b	Nitrate+Nitrite	0.250	mg/L	12	100	12	26.074	26.074	26.074	
5a	DOC	0.500	mg/L	50	100	50	121.391	121.391	121.391	
5b	TOC	5.000	mg/L	4	100	4	278.136	278.136	278.136	
8	Total Suspended Solids	5.000	mg/L	354	93	354	589.142	589.224	589.550	
8	Volatile Suspended Solids	10.000	mg/L	4	50	4	573.389	573.389	573.389	
9	Aluminum	30.000	ug/L	151	99	151	52.320	52.321	52.323	
9	Cadmium	2.000	ug/L	151	54	151	0.221	0.233	0.245	
9	Copper	10.000	ug/L	151	48	151	0.630	0.630	0.630	
9	Lead	30.000	ug/L	151	70	151	4.307	4.365	4.481	
9	Zinc	10.000	ug/L	151	100	151	68.548	68.548	68.548	
12	Mercury	0.100	ug/L	12	33	12	0.004	0.004	0.004	
14	Phenolics (4AAP)	2.000	ug/L	349	93	349	18.355	18.355	18.355	
17	Benzene	0.500	ug/L	11	72	11	0.036	0.036	0.037	
17	Styrene	0.500	ug/L	11	36	11	0.020	0.024	0.028	
17	Toluene	0.500	ug/L	11	63	11	0.023	0.023	0.023	
19	1–Methylnaphthalene	3.200	ug/L	12	41	12	0.102	0.103	0.114	
19	2–Methylnaphthalene	2.200	ug/L	12	50	12	0.078	0.079	0.086	
19	Benzobutylphthalate	0.600	ug/L	12	75	12	0.146	0.146	0.146	
19	Biphenyl	0.600	ug/L	12	33	12	0.024	0.024	0.024	
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	50	12	0.096	0.119	0.130	
19	Di–n–butyl Phthalate	3.800	ug/L	12	41	12	0.113	0.139	0.148	
19	Fluoranthene	0.400	ug/L	12	41	12	0.014	0.016	0.017	
19	Naphthalene	1.600	ug/L	50	57	50	0.062	0.065	0.072	
19	Phenanthrene	0.400	ug/L	50	74	50	0.053	0.053	0.053	

ATG = ANALYTICAL TEST GROUP

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MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition

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METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT: 0300 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
20	2,4–Dimethylphenol	7.300	ug/L	12	91	12	1.054	1.054	1.060	
20	Phenol	2.400	ug/L	12	91	12	20.113	20.113	20.115	
20	m–Cresol	3.400	ug/L	12	91	12	0.612	0.613	0.615	
20	o–Cresol	3.700	ug/L	12	91	12	4.446	4.447	4.449	
20	p–Cresol	3.500	ug/L	12	91	12	1.199	1.200	1.202	
24	Octachlorodibenzo–p–dioxir	0.030	ng/L	2	100	2	0.002	0.002	0.002	g
24	Octachlorodibenzofuran	0.030	ng/L	2	50	2	0.002	0.002	0.002	g
24	Total H6CDF	0.020	ng/L	2	50	2	0.341	0.524	0.707	m
24	Total TCDF	0.015	ng/L	2	100	2	0.002	0.002	0.002	g
25	Oil and Grease	1.000	mg/L	151	46	151	63.117	63.117	63.117	
27	PCBT	0.100	ug/L	12	58	12	0.004	0.004	0.004	
MC1	Iron	0.020	mg/L	151	99	151	38.484	38.484	38.484	
MC1	Magnesium	0.020	mg/L	151	100	151	284.613	284.613	284.613	
MC2	Fluoride	0.100	mg/L	151	98	151	280.494	280.494	280.494	

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
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LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

TOTAL MASS LOADINGS [kg] FOR EVENT ORIENTED STREAM

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT: 0500 – EMERGENCY OVERFLOW

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	LTA LOADING	R
1	Chemical Oxygen Demand	10.000	mg/L	1	100	1	51.075	
8	Total Suspended Solids	5.000	mg/L	11	100	1	10.215	
14	Phenolics (4AAP)	2.000	ug/L	33	100	1	0.003	
19	Phenanthrene	0.400	ug/L	104	50	1	0.681	g
25	Oil and Grease	1.000	mg/L	149	100	1	3.405	
27	PCBT	0.100	ug/L	158	50	1	0.034	g
MC1	Iron	0.020	mg/L	167	100	1	1.141	
MC1	Magnesium	0.020	mg/L	168	100	1	17.366	
MC2	Fluoride	0.100	mg/L	169	100	1	0.341	

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LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

FRANKLIN ELECTRIC OF CANADA, STRATHROY

CONTROL POINT: 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	5	100	4	10.978	10.978	10.978	
4a	Ammonia plus Ammonium	0.250	mg/L	5	80	4	0.079	0.079	0.079	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	5	80	4	3.651	3.651	3.651	
4b	Nitrate+Nitrite	0.250	mg/L	5	100	4	0.616	0.616	0.616	
5a	DOC	0.500	mg/L	14	100	12	20.704	20.704	20.704	
5b	TOC	5.000	mg/L	5	100	4	25.792	25.792	25.792	
6	Total Phosphorus	0.100	mg/L	5	60	4	0.157	0.160	0.162	
8	Total Suspended Solids	5.000	mg/L	14	64	12	6.444	6.444	6.444	
9	Aluminum	30.000	ug/L	14	100	12	0.055	0.055	0.055	
9	Cadmium	2.000	ug/L	14	57	12	0.001	0.001	0.002	
9	Nickel	20.000	ug/L	14	57	12	0.007	0.007	0.008	
9	Thallium	30.000	ug/L	14	50	12	0.012	0.012	0.012	
9	Vanadium	30.000	ug/L	14	28	12	0.004	0.007	0.009	
9	Zinc	10.000	ug/L	14	71	12	0.008	0.008	0.008	
11	Chromium (hexavalent)	10.000	ug/L	14	42	12	0.008	0.008	0.009	
25	Oil and Grease	1.000	mg/L	14	42	12	0.504	0.504	0.504	
26	Abietic Acid	0.005	mg/L	5	60	4	0.006	0.006	0.006	
MC1	Iron	0.020	mg/L	14	100	12	0.081	0.081	0.081	
MC1	Magnesium	0.020	mg/L	14	100	12	17.338	17.338	17.338	
MC2	Fluoride	0.100	mg/L	5	100	4	0.180	0.180	0.180	

ATG = ANALYTICAL TEST GROUP
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MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'.

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

GENERAL MOTORS OF CANADA, ST. CATHARINES

CONTROL POINT: 0900 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	153	73	153	1,309.456	1,383.318	1,414.973	
2	Cyanide Total	0.005	mg/L	12	50	12	0.598	0.639	0.666	
4a	Ammonia plus Ammonium	0.250	mg/L	12	91	12	91.021	91.021	91.021	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	4	183.708	183.708	183.708	
4b	Nitrate+Nitrite	0.250	mg/L	10	90	10	36.504	38.055	38.443	
5a	DOC	0.500	mg/L	51	100	51	246.866	246.866	246.866	
8	Total Suspended Solids	5.000	mg/L	344	40	344	604.657	656.146	733.379	
9	Aluminum	30.000	ug/L	153	99	153	44.529	44.531	44.529	
9	Cadmium	2.000	ug/L	153	24	153	0.179	0.197	0.212	
9	Chromium	20.000	ug/L	154	15	154	1.942	1.976	2.255	
9	Lead	30.000	ug/L	153	60	153	4.215	4.371	4.543	
9	Zinc	10.000	ug/L	153	99	153	52.471	52.472	52.471	
14	Phenolics (4AAP)	2.000	ug/L	343	92	343	6.563	6.565	6.567	
16	Chloroform	0.700	ug/L	12	41	12	0.070	0.070	0.070	
17	Benzene	0.500	ug/L	12	75	12	0.073	0.079	0.080	
17	Toluene	0.500	ug/L	12	50	12	0.056	0.056	0.056	
17	m–Xylene and p–Xylene	1.100	ug/L	12	33	12	0.097	0.156	0.162	
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	33	12	0.314	0.400	0.440	
20	2,4–Dimethylphenol	7.300	ug/L	12	50	12	1.823	1.862	2.083	
20	Phenol	2.400	ug/L	12	33	12	0.467	0.517	0.601	
20	m–Cresol	3.400	ug/L	12	41	12	0.518	0.557	0.682	
20	o–Cresol	3.700	ug/L	12	58	12	2.585	2.605	2.692	
20	p–Cresol	3.500	ug/L	12	41	12	0.519	0.558	0.688	
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	50	2	0.002	0.002	0.003	g
25	Oil and Grease	1.000	mg/L	151	54	151	108.095	108.095	108.095	
26	Abietic Acid	0.005	mg/L	12	50	12	0.620	0.634	0.643	
26	Levopimaric Acid	0.005	mg/L	12	66	12	0.718	0.718	0.718	
26	Neoabietic Acid	0.005	mg/L	12	83	12	0.760	0.760	0.760	
MC1	Iron	0.020	mg/L	153	100	153	51.135	51.135	51.135	
MC1	Magnesium	0.020	mg/L	153	100	153	682.099	682.099	682.099	
MC2	Fluoride	0.100	mg/L	12	100	12	23.819	23.819	23.819	

ATG = ANALYTICAL TEST GROUP

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METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

GENERAL MOTORS OF CANADA, ST. CATHARINES

CONTROL POINT: 1000 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	52	78	52	2414.658	2602.057	2682.371	
2	Cyanide Total	0.005	mg/L	12	50	12	0.560	0.653	0.746	
4a	Ammonia plus Ammonium	0.250	mg/L	12	91	12	78.376	78.376	78.376	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	4	233.823	233.823	233.823	
4b	Nitrate+Nitrite	0.250	mg/L	3	66	3	49.302	49.302	49.302	
5a	DOC	0.500	mg/L	52	98	52	425.164	426.436	426.754	
6	Total Phosphorus	0.100	mg/L	52	21	52	10.323	10.806	14.940	
8	Total Suspended Solids	5.000	mg/L	152	50	152	1961.567	2034.940	2145.000	
9	Aluminum	30.000	ug/L	52	100	52	73.974	73.974	73.974	
9	Cadmium	2.000	ug/L	52	19	52	0.214	0.261	0.300	
9	Chromium	20.000	ug/L	52	19	52	2.428	2.501	3.147	
9	Lead	30.000	ug/L	52	28	52	3.438	4.119	4.716	
9	Zinc	10.000	ug/L	52	100	52	53.244	53.244	53.244	
14	Phenolics (4AAP)	2.000	ug/L	152	94	152	6.494	6.499	6.503	
16	Chloroform	0.700	ug/L	4	50	4	0.113	0.113	0.113	
25	Oil and Grease	1.000	mg/L	152	66	152	239.325	239.325	239.325	
26	Abietic Acid	0.005	mg/L	4	50	4	1.050	1.050	1.050	
26	Levopimaric Acid	0.005	mg/L	4	75	4	1.255	1.255	1.255	
26	Neoabietic Acid	0.005	mg/L	4	75	4	1.255	1.255	1.255	
MC1	Iron	0.020	mg/L	52	100	52	92.312	92.312	92.312	
MC1	Magnesium	0.020	mg/L	52	100	52	1300.736	1300.736	1300.736	
MC2	Fluoride	0.100	mg/L	4	100	4	31.042	31.042	31.042	

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METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT: 0100 – COMBINED EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	155	100	155	10.203	10.203	10.203	
4a	Ammonia plus Ammonium	0.250	mg/L	155	58	155	0.255	0.260	0.260	
5a	DOC	0.500	mg/L	53	100	53	0.924	0.924	0.924	
6	Total Phosphorus	0.100	mg/L	52	98	52	0.105	0.105	0.105	
8	Total Suspended Solids	5.000	mg/L	253	98	253	4.601	4.603	4.605	
16	1,1–Dichloroethane	0.800	ug/L	4	50	4	0.089	0.095	0.115	g
16	Methylene Chloride	1.300	ug/L	4	75	4	0.539	0.542	0.557	g
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	4	100	4	0.002	0.002	0.002	
20	4–Nitrophenol	1.400	ug/L	4	100	4	0.286	0.286	0.286	g
20	Pentachlorophenol	1.300	ug/L	4	100	4	0.115	0.115	0.115	g
20	Phenol	2.400	ug/L	4	50	4	0.338	0.341	0.363	g
25	Oil and Grease	1.000	mg/L	154	20	154	0.065	0.070	0.071	

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R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT: 0200 – PROCESS EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	158	100	158	57.866	57.866	57.866	
2	Cyanide Total	0.005	mg/L	12	100	12	0.199	0.199	0.199	
4a	Ammonia plus Ammonium	0.250	mg/L	158	97	158	4.665	4.666	4.666	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	2	100	2	7.223	7.223	7.223	
4b	Nitrate+Nitrite	0.250	mg/L	52	90	52	4.106	4.106	4.110	
5a	DOC	0.500	mg/L	52	100	52	6.203	6.203	6.203	
5b	TOC	5.000	mg/L	2	100	2	7.818	7.818	7.818	
6	Total Phosphorus	0.100	mg/L	51	100	51	0.347	0.347	0.347	
8	Total Suspended Solids	5.000	mg/L	361	99	361	41.962	41.964	41.965	
9	Aluminum	30.000	ug/L	155	100	155	0.338	0.338	0.338	
9	Beryllium	10.000	ug/L	155	34	155	0.001	0.001	0.002	
9	Cadmium	2.000	ug/L	155	63	155	0.747	0.836	0.846	g
9	Chromium	20.000	ug/L	155	98	155	0.128	0.128	0.128	
9	Cobalt	20.000	ug/L	155	67	155	0.007	0.007	0.007	
9	Copper	10.000	ug/L	155	99	155	0.090	0.090	0.090	
9	Lead	30.000	ug/L	155	67	155	0.009	0.009	0.010	
9	Molybdenum	20.000	ug/L	154	34	154	0.003	0.004	0.004	
9	Nickel	20.000	ug/L	155	47	155	0.007	0.007	0.007	
9	Silver	30.000	ug/L	155	88	155	0.056	0.057	0.057	
9	Vanadium	30.000	ug/L	155	43	155	0.010	0.010	0.010	
9	Zinc	10.000	ug/L	155	100	155	0.132	0.132	0.132	
10	Antimony	5.000	ug/L	2	100	2	0.041	0.041	0.041	
10	Arsenic	5.000	ug/L	2	100	2	0.070	0.070	0.070	
10	Selenium	5.000	ug/L	2	100	2	0.026	0.026	0.026	
12	Mercury	0.100	ug/L	11	81	11	0.760	0.760	0.760	g
14	Phenolics (4AAP)	2.000	ug/L	360	55	360	0.004	0.004	0.004	
16	1,1–Dichloroethane	0.800	ug/L	12	41	12	0.110	0.135	0.184	g
16	Methylene Chloride	1.300	ug/L	12	66	12	0.822	0.831	0.878	g

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

FD(%) = FREQUENCY OF DETECTION (PERCENT)

NLOAD = NUMBER OF LOADING OBSERVATIONS

LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions

MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition

MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition

R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT: 0200 – PROCESS EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
17	o–Xylene	0.500	ug/L	12	33	12	0.054	0.073	0.103	g
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	75	12	0.001	0.001	0.001	
20	4–Nitrophenol	1.400	ug/L	12	91	12	0.837	0.837	0.837	g
20	Pentachlorophenol	1.300	ug/L	12	91	12	0.405	0.405	0.405	g
23	1,2,3–Trichlorobenzene	0.010	ug/L	4	50	4	0.004	0.004	0.004	g
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	100	2	0.119	0.119	0.119	m
24	Total H6CDD	0.030	ng/L	2	50	2	0.004	0.006	0.006	m
24	Total H6CDF	0.020	ng/L	2	50	2	0.009	0.009	0.009	m
24	Total H7CDD	0.030	ng/L	2	50	2	0.014	0.016	0.016	m
24	Total H7CDF	0.030	ng/L	2	50	2	0.004	0.006	0.006	m
24	Total PCDF	0.015	ng/L	2	50	2	0.003	0.003	0.003	m
24	Total TCDF	0.015	ng/L	2	50	2	0.002	0.002	0.003	m
25	Oil and Grease	1.000	mg/L	156	39	156	0.216	0.224	0.225	
26	Abietic Acid	0.005	mg/L	11	100	11	0.003	0.003	0.003	
26	Chlorodehydroabietic Acid	0.005	mg/L	12	100	12	0.003	0.003	0.003	
26	Dehydroabietic Acid	0.005	mg/L	12	100	12	0.004	0.004	0.004	
26	Isopimaric Acid	0.005	mg/L	12	100	12	0.003	0.003	0.003	
26	Levopimaric Acid	0.005	mg/L	12	100	12	0.003	0.003	0.003	
26	Neoabietic Acid	0.005	mg/L	12	100	12	0.004	0.004	0.004	
26	Pimaric Acid	0.005	mg/L	12	100	12	0.003	0.003	0.003	
26	Oleic Acid	0.005	mg/L	12	100	12	0.006	0.006	0.006	
MC1	Iron	0.020	mg/L	155	100	155	53.478	53.478	53.478	
MC1	Magnesium	0.020	mg/L	155	100	155	389.849	389.849	389.849	
MC2	Fluoride	0.100	mg/L	155	100	155	4.501	4.501	4.501	

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
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LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
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R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT: 0300 – STORM WATER EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	12	100	11	10.076	10.076	10.076	
2	Cyanide Total	0.005	mg/L	12	50	11	0.048	0.048	0.048	
4a	Ammonia plus Ammonium	0.250	mg/L	12	50	11	3.044	3.049	3.049	
4b	Nitrate+Nitrite	0.250	mg/L	12	100	11	0.267	0.267	0.267	
5a	DOC	0.500	mg/L	12	100	11	0.865	0.865	0.865	
6	Total Phosphorus	0.100	mg/L	12	50	11	0.008	0.013	0.013	
8	Total Suspended Solids	5.000	mg/L	12	100	11	22.476	22.476	22.476	
9	Aluminum	30.000	ug/L	12	91	11	0.176	0.176	0.176	
9	Beryllium	10.000	ug/L	12	33	11	0.840	1.033	1.484	g
9	Chromium	20.000	ug/L	12	66	11	0.003	0.003	0.003	
9	Cobalt	20.000	ug/L	12	58	11	0.005	0.005	0.005	
9	Copper	10.000	ug/L	12	75	11	0.002	0.002	0.002	
9	Lead	30.000	ug/L	12	50	11	0.005	0.006	0.007	
9	Vanadium	30.000	ug/L	12	50	11	0.007	0.007	0.007	
9	Zinc	10.000	ug/L	12	91	11	0.023	0.023	0.023	
14	Phenolics (4AAP)	2.000	ug/L	12	66	11	0.005	0.005	0.005	
25	Oil and Grease	1.000	mg/L	12	0	11	0.089	0.097	0.098	
MC1	Iron	0.020	mg/L	12	100	11	25.647	25.647	25.647	
MC1	Magnesium	0.020	mg/L	12	100	11	6.151	6.151	6.151	
MC2	Fluoride	0.100	mg/L	12	91	11	1.076	1.077	1.078	

ATG = ANALYTICAL TEST GROUP
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LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
MINIMUM LTA = MINIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

KUBOTA METAL , FAHRAMET DIV., ORILLIA

CONTROL POINT: 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
1	Chemical Oxygen Demand	10.000	mg/L	4	75	4	7.503	8.351	8.445	
2	Cyanide Total	0.005	mg/L	4	75	4	0.003	0.003	0.003	
4a	Ammonia plus Ammonium	0.250	mg/L	4	100	4	0.341	0.341	0.341	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	100	4	0.484	0.484	0.484	
4b	Nitrate+Nitrite	0.250	mg/L	4	100	4	0.178	0.178	0.178	
5a	DOC	0.500	mg/L	12	100	12	1.659	1.659	1.659	
5b	TOC	5.000	mg/L	4	75	4	1.860	1.860	1.860	
6	Total Phosphorus	0.100	mg/L	4	50	4	0.024	0.025	0.029	
8	Total Suspended Solids	5.000	mg/L	12	100	12	8.754	8.754	8.754	
9	Aluminum	30.000	ug/L	12	100	12	0.105	0.105	0.105	
9	Copper	10.000	ug/L	12	66	12	0.005	0.005	0.006	
9	Silver	30.000	ug/L	12	41	12	0.008	0.009	0.014	
9	Zinc	10.000	ug/L	12	50	12	0.004	0.005	0.006	
14	Phenolics (4AAP)	2.000	ug/L	12	66	12	0.002	0.002	0.002	
15	Sulphide	0.020	mg/L	4	50	4	0.019	0.019	0.019	
16	Chloroform	0.700	ug/L	4	50	4	0.259	0.308	0.372	g
25	Oil and Grease	1.000	mg/L	12	58	12	1.479	1.479	1.479	
MC1	Iron	0.020	mg/L	12	100	12	0.049	0.049	0.049	
MC1	Magnesium	0.020	mg/L	12	100	12	3.237	3.237	3.237	
MC2	Fluoride	0.100	mg/L	12	83	12	0.052	0.052	0.052	

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
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FD(%) = FREQUENCY OF DETECTION (PERCENT)
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MAXIMUM LTA = MAXIMUM LONG TERM AVERAGE LOADING – See sections 4.4 and 4.6 for definition
R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

RICHMOND DIE CASTING LTD., CORNWALL

CONTROL POINT: 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
5a	DOC	0.500	mg/L	11	100	11	12.729	12.729	12.729	
8	Total Suspended Solids	5.000	mg/L	12	33	12	19.908	22.627	24.851	
9	Aluminum	30.000	ug/L	12	83	12	0.155	0.155	0.155	
9	Zinc	10.000	ug/L	12	75	12	0.038	0.039	0.041	
11	Chromium (hexavalent)	10.000	ug/L	10	50	10	0.023	0.026	0.033	
25	Oil and Grease	1.000	mg/L	12	41	12	5.393	5.393	5.393	
MC1	Iron	0.020	mg/L	12	100	12	0.200	0.200	0.200	
MC1	Magnesium	0.020	mg/L	12	100	12	15.710	15.710	15.710	
MC2	Fluoride	0.100	mg/L	12	91	12	0.262	0.262	0.262	

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
N = NUMBER OF OBSERVATIONS
FD(%) = FREQUENCY OF DETECTION (PERCENT)
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LTA = LONG TERM AVERAGE LOADING – See Chapter 4.6 for definitions
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R = REMARK: g = loading in 'g/day' m = loading in 'mg/day'

METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

WESTERN FOUNDRY CO. LTD., WINGHAM

CONTROL POINT: 0100 – COOLING WATER (ARTHUR STREET)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
5a	DOC	0.500	mg/L	11	100	11	0.322	0.322	0.322	
8	Total Suspended Solids	5.000	mg/L	11	0	11	0.904	1.517	1.755	
9	Aluminum	30.000	ug/L	12	91	12	0.028	0.028	0.028	
9	Copper	10.000	ug/L	12	41	12	0.003	0.003	0.003	
9	Zinc	10.000	ug/L	12	83	12	0.018	0.018	0.018	
14	Phenolics (4AAP)	2.000	ug/L	11	72	11	0.002	0.002	0.003	
25	Oil and Grease	1.000	mg/L	10	60	10	0.796	0.817	0.883	
MC1	Iron	0.020	mg/L	12	100	12	0.099	0.099	0.099	
MC1	Magnesium	0.020	mg/L	12	100	12	8.830	8.830	8.830	
MC2	Fluoride	0.100	mg/L	11	100	11	0.337	0.337	0.337	

ATG = ANALYTICAL TEST GROUP
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FD(%) = FREQUENCY OF DETECTION (PERCENT)
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METAL CASTING SECTOR

12 MONTH DATABASE – MAY 01, 1990 TO APRIL 30, 1991

LONG TERM AVERAGE (LTA) LOADINGS (kg/day)

WESTERN FOUNDRY CO. LTD., WINGHAM

CONTROL POINT: 0200 – COOLING WATER (CNR BRIDGE)

ATG	PARAMETER	RMDL	UNITS	N	FD(%)	NLOAD	MINIMUM LTA	LTA	MAXIMUM LTA	R
5a	DOC	0.500	mg/L	11	81	11	0.718	0.718	0.718	
8	Total Suspended Solids	5.000	mg/L	11	36	11	4.159	4.756	4.989	
9	Aluminum	30.000	ug/L	12	91	12	0.057	0.057	0.057	
9	Copper	10.000	ug/L	12	33	12	0.006	0.006	0.006	
9	Zinc	10.000	ug/L	12	83	12	0.015	0.015	0.015	
14	Phenolics (4AAP)	2.000	ug/L	11	45	11	0.487	1.198	2.265	g
25	Oil and Grease	1.000	mg/L	10	50	10	1.990	2.128	2.557	
MC1	Iron	0.020	mg/L	12	100	12	0.194	0.194	0.194	
MC1	Magnesium	0.020	mg/L	12	100	12	20.892	20.892	20.892	
MC2	Fluoride	0.100	mg/L	11	100	11	0.774	0.774	0.774	

ATG = ANALYTICAL TEST GROUP
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APPENDIX VI

SITE LOADINGS

METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) SITE LOADINGS [kg/day]

GENERAL MOTORS OF CANADA, ST. CATHARINES
INTAKE WATER – CONTROL POINT 0200
DISCHARGE CONTROL POINT 1000 – COMBINED EFFLUENT (FINAL)

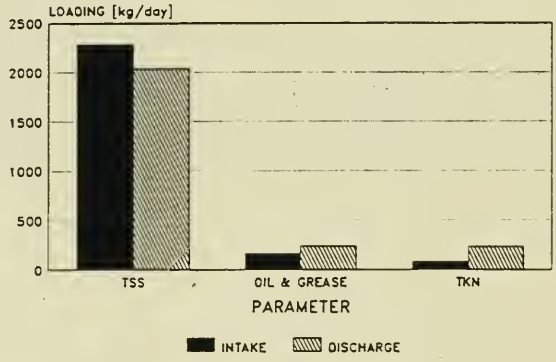
ATG	PARAMETER	RMDL	UNITS	NI	INTAKE LOADING	N	DISCHARGE LOADING	R
4a	Total Kjeldahl Nitrogen	0.500	mg/L	11	79.681	4	233.823	
8	Total Suspended Solids	5.000	mg/L	12	2282.385	152	2034.940	
14	Phenolics (4AAP)	2.000	ug/L	12	0.215	152	6.499	
25	Oil and Grease	1.000	mg/L	12	162.670	152	239.325	

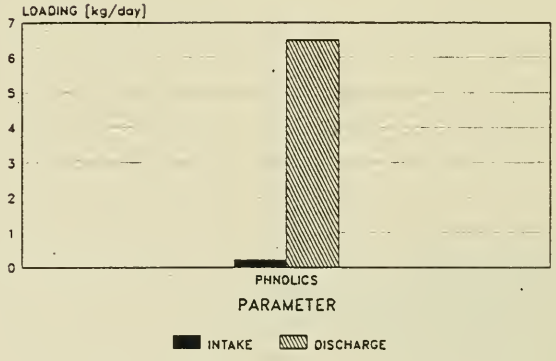
ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
NI = NUMBER OF OBSERVATIONS FOR INTAKE
N = NUMBER OF OBSERVATIONS FOR DISCHARGE
R = REMARK FOR LOADING UNIT
g = loading in 'g/day'
m = loading in 'mg/day'

SITE LOADINGS

GENERAL MOTORS OF CANADA

DISCHARGE CONTROL POINT 1000





NOTE: Scale may vary

METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) SITE LOADINGS [kg/day]

HALEY INDUSTRIES LTD., HALEY
INTAKE WATER – CONTROL POINT 0400
DISCHARGE CONTROL POINT 0200 – PROCESS EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	NI	INTAKE LOADING	N	DISCHARGE LOADING	R
1	Chemical Oxygen Demand	10.000	mg/L	3	13.050	158	57.866	
2	Cyanide Total	0.005	mg/L	3	0.002	12	0.199	
4b	Nitrate+Nitrite	0.250	mg/L	3	0.225	52	4.106	
5a	DOC	0.500	mg/L	3	1.189	52	6.203	
6	Total Phosphorus	0.100	mg/L	3	0.015	51	0.347	
8	Total Suspended Solids	5.000	mg/L	3	0.508	361	41.964	
9	Aluminum	30.000	ug/L	3	0.004	155	0.338	
9	Beryllium	10.000	ug/L	3	0.001	155	0.001	
9	Cadmium	2.000	ug/L	3	1.010	155	0.836	g
9	Chromium	20.000	ug/L	3	0.004	155	0.128	
9	Cobalt	20.000	ug/L	3	0.003	155	0.007	
9	Copper	10.000	ug/L	3	0.001	155	0.090	
9	Lead	30.000	ug/L	3	0.005	155	0.009	
9	Molybdenum	20.000	ug/L	3	0.007	154	0.004	
9	Nickel	20.000	ug/L	3	0.004	155	0.007	
9	Vanadium	30.000	ug/L	3	0.004	155	0.010	
9	Zinc	10.000	ug/L	3	0.006	155	0.132	
12	Mercury	0.100	ug/L	3	0.015	11	0.760	g
16	Methylene Chloride	1.300	ug/L	3	1.110	12	0.831	g
20	4–Nitrophenol	1.400	ug/L	3	0.725	12	0.837	g
20	Pentachlorophenol	1.300	ug/L	3	0.290	12	0.405	g
25	Oil and Grease	1.000	mg/L	3	0.131	156	0.224	
MC1	Iron	0.020	mg/L	3	0.022	155	53.478	
MC1	Magnesium	0.020	mg/L	3	1.813	155	389.849	
MC2	Fluoride	0.100	mg/L	3	0.290	155	4.501	

ATG = ANALYTICAL TEST GROUP
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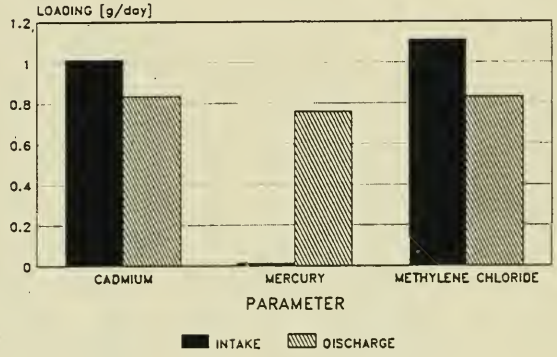
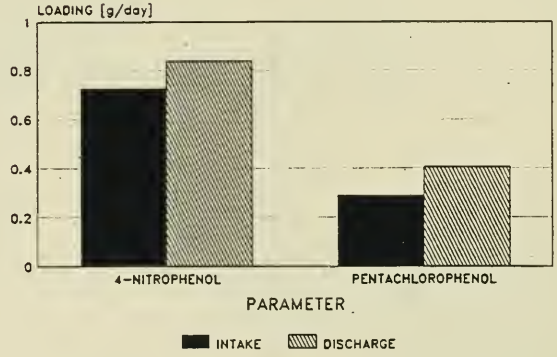
g = loading in 'g/day'
m = loading in 'mg/day'

SITE LOADINGS

HALEY INDUSTRIES LTD.

DISCHARGE CONTROL POINT 0200



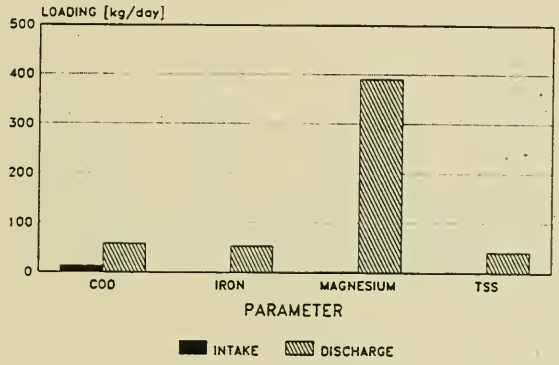


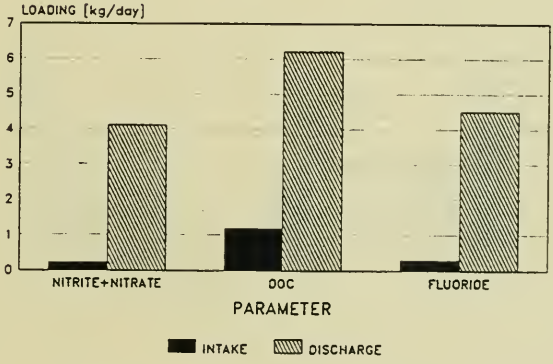
NOTE: Scale may vary

SITE LOADINGS

HALEY INDUSTRIES LTD.

DISCHARGE CONTROL POINT 0200



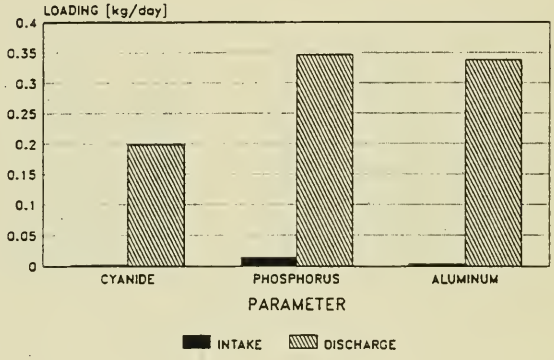


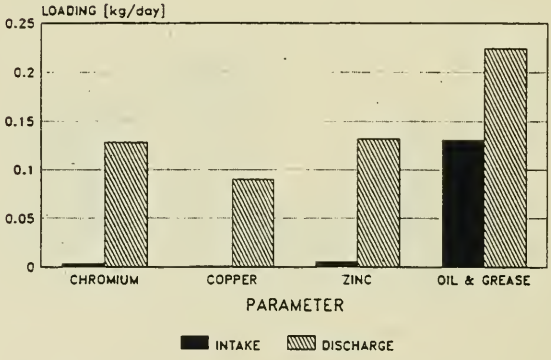
NOTE: Scale may vary

SITE LOADINGS

HALEY INDUSTRIES LTD.

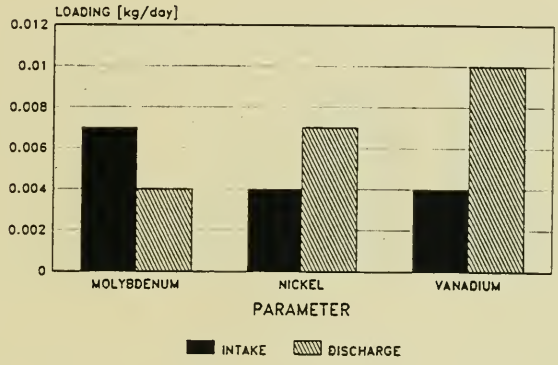
DISCHARGE CONTROL POINT 0200

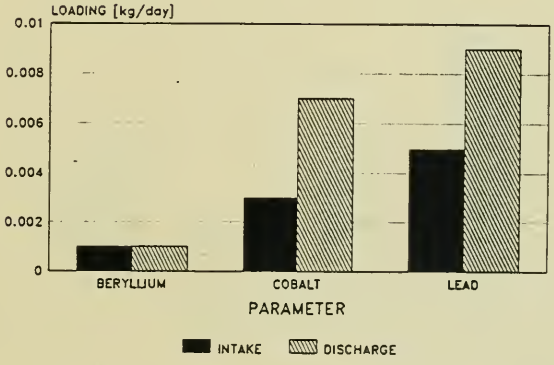




NOTE: Scale may vary

SITE LOADINGS
HALEY INDUSTRIES LTD.
DISCHARGE CONTROL POINT 0200





NOTE: Scale may vary

METAL CASTING SECTOR
12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

LONG TERM AVERAGE (LTA) SITE LOADINGS [kg/day]

RICHMOND DIE CASTING LTD., CORNWALL
INTAKE WATER – CONTROL POINT 0200
DISCHARGE CONTROL POINT 0100 – PROCESS EFFLUENT (FINAL)

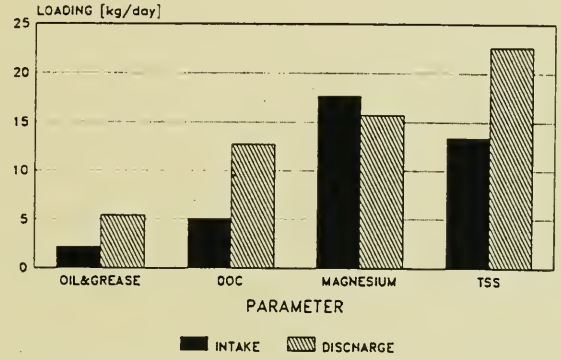
ATG	PARAMETER	RMDL	UNITS	NI	INTAKE LOADING	N	DISCHARGE LOADING	R
5a	DOC	0.500	mg/L	2	5.087	11	12.729	
8	Total Suspended Solids	5.000	mg/L	1	13.392	12	22.627	
9	Aluminum	30.000	ug/L	2	0.133	12	0.155	
9	Zinc	10.000	ug/L	2	0.043	12	0.039	
25	Oil and Grease	1.000	mg/L	2	2.166	12	5.393	
MC1	Iron	0.020	mg/L	2	0.124	12	0.200	
MC1	Magnesium	0.020	mg/L	2	17.676	12	15.710	
MC2	Fluoride	0.100	mg/L	2	0.290	12	0.262	

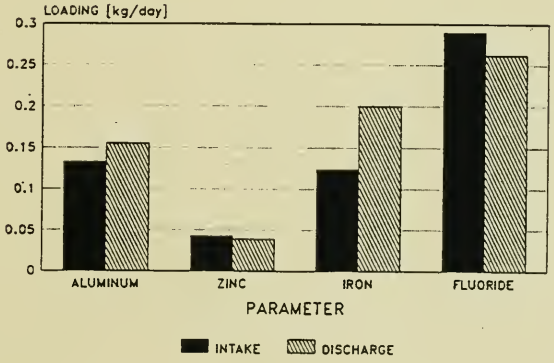
ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
NI = NUMBER OF OBSERVATIONS FOR INTAKE
N = NUMBER OF OBSERVATIONS FOR DISCHARGE
R = REMARK FOR LOADING UNIT
g = loading in 'g/day'
m = loading in 'mg/day'

SITE LOADINGS

RICHMOND DIE CASTING LTD.

DISCHARGE CONTROL POINT 0100





NOTE: Scale may vary

APPENDIX VII

MONITORING AND INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

CANADA ALLOY CASTING LTD., KITCHENER

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
3	Hydrogen Ion (pH)			12	7.400	8.000	7.783	2	8.110	H
5a	DOC	0.500	mg/L	12	0.600	3.200	1.500	2	6.500	H
8	Total Suspended Solids	5.000	mg/L	12	3.600	5.000	4.250	2	35.350	H
9	Aluminum	30.000	ug/L	12	6.800	74.000	40.633	2	520.000	H
9	Cadmium	2.000	ug/L	12	1.000	3.500	2.042	2	1.550	
9	Copper	10.000	ug/L	12	3.700	27.800	12.042	2	64.000	H
9	Zinc	10.000	ug/L	12	8.200	10500.000	891.308	2	128.500	
25	Oil and Grease	1.000	mg/L	11	0.230	6.560	2.620	1	1.000	
MC1	Iron	0.020	mg/L	12	0.034	0.180	0.109	2	2.750	H
MC1	Magnesium	0.020	mg/L	12	21.000	39.420	30.297	2	31.500	
MC2	Fluoride	0.100	mg/L	12	0.190	0.320	0.254	2	0.520	H

ATG = ANALYTICAL TEST GROUP
RMDL = REGULATION METHOD DETECTION LIMIT
N = NUMBER OF OBSERVATIONS
NI = NUMBER OF MOE INSPECTION OBSERVATIONS
LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions
MOE = MINISTRY OF THE ENVIRONMENT
R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA *

CANADA PIPE COMPANY LTD., HAMILTON

CONTROL POINT 0100 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.
1	Chemical Oxygen Demand	10.000	mg/L	4	31.000	800.000	282.750
2	Cyanide Total	0.005	mg/L	4	0.017	1.600	0.424
3	Hydrogen Ion (pH)			42	6.300	10.500	7.990
4a	Ammonia plus Ammonium	0.250	mg/L	4	0.240	7.700	3.060
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	1.400	31.000	15.400
4b	Nitrate+Nitrite	0.250	mg/L	4	0.520	7.400	4.055
5a	DOC	0.500	mg/L	12	5.200	350.000	70.100
5b	TOC	5.000	mg/L	3	24.000	200.000	94.667
6	Total Phosphorus	0.100	mg/L	4	0.150	1.500	0.520
7	Specific Conductance	5.000	uS/cm	4	470.000	29000.000	13167.500
8	Total Suspended Solids	5.000	mg/L	42	4.200	41000.000	1479.157
9	Aluminum	30.000	ug/L	12	95.000	33000.000	5550.417
9	Cadmium	2.000	ug/L	12	10.000	13000.000	2274.333
9	Chromium	20.000	ug/L	12	3.000	5200.000	549.250
9	Copper	10.000	ug/L	12	15.000	19000.000	1973.583
9	Lead	30.000	ug/L	12	82.000	240000.000	30421.833
9	Molybdenum	20.000	ug/L	12	3.000	1200.000	185.833
9	Nickel	20.000	ug/L	12	9.000	1700.000	188.667
9	Zinc	10.000	ug/L	12	1800.000	2200000.00	313133.33
10	Antimony	5.000	ug/L	4	5.000	100.000	51.000
10	Arsenic	5.000	ug/L	4	4.000	23.000	13.250
10	Selenium	5.000	ug/L	4	3.000	150.000	51.000
12	Mercury	0.100	ug/L	4	0.060	1.700	0.847
13	Tri–alkyl lead (Total)	2.000	ug/L	8	1.000	2.000	1.375
13	Tetra–alkyl lead (Total)	2.000	ug/L	8	1.000	2.000	1.375
14	Phenolics (4AAP)	2.000	ug/L	42	4.000	640.000	73.214
15	Sulphide	0.020	mg/L	4	0.040	0.180	0.095
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	4	1.400	2.900	2.125
25	Oil and Grease	1.000	mg/L	41	0.960	36.000	7.180
MC1	Iron	0.020	mg/L	12	0.800	3500.000	334.433
MC1	Magnesium	0.020	mg/L	12	8.400	340.000	60.267
MC2	Fluoride	0.100	mg/L	12	1.400	170.000	25.433

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions

* Inspection not conducted at this control point

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

CHRYSLER CANADA LTD., ETOBICOKE

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
3	Hydrogen Ion (pH)			12	6.850	7.430	7.124	1	8.120	H
5a	DOC	0.500	mg/L	12	10.890	45.820	35.893	1	1.800	L
8	Total Suspended Solids	5.000	mg/L	12	5.000	7.200	5.183	1	0.700	L
9	Aluminum	30.000	ug/L	12	28.000	200.000	122.333	1	90.000	
9	Cadmium	2.000	ug/L	12	1.000	24.000	5.692	1	0.200	L
9	Chromium	20.000	ug/L	13	10.000	73.000	21.000	1	3.000	L
9	Copper	10.000	ug/L	12	10.000	48.000	22.417	1	21.000	
9	Lead	30.000	ug/L	12	10.000	60.000	22.500	1	5.000	L
9	Nickel	20.000	ug/L	12	10.000	110.000	24.167	1	9.000	L
9	Vanadium	30.000	ug/L	13	20.000	90.000	40.000	1	0.500	L
9	Zinc	10.000	ug/L	12	10.000	200.000	57.083	1	11.000	
25	Oil and Grease	1.000	mg/L	12	1.000	5.900	2.075	1	19.000	H
MC1	Iron	0.020	mg/L	12	0.010	0.120	0.067	1	0.086	
MC1	Magnesium	0.020	mg/L	12	10.130	15.620	12.052	1	7.900	L
MC2	Fluoride	0.100	mg/L	12	0.780	1.030	0.921	1	1.160	H

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

NI = NUMBER OF MOE INSPECTION OBSERVATIONS

LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions

MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT 0100 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	156	10.000	77.000	18.397	1	16.000	
2	Cyanide Total	0.005	mg/L	12	0.003	0.069	0.023	1	0.015	
3	Hydrogen Ion (pH)			364	2.700	8.200	7.023	1	7.800	
4a	Ammonia plus Ammonium	0.250	mg/L	12	0.030	0.390	0.256	1	0.250	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	0.660	1.790	1.137	1	0.650	L
4b	Nitrate+Nitrite	0.250	mg/L	12	0.340	1.540	0.796	1	1.150	
5a	DOC	0.500	mg/L	52	0.900	8.100	3.402	1	3.100	
5b	TOC	5.000	mg/L	4	4.300	7.100	5.750	1	5.000	
7	Specific Conductance	5.000	uS/cm	364	228.000	548.000	324.538	1	329.000	
8	Total Suspended Solids	5.000	mg/L	364	1.000	156.000	13.503	1	22.600	
8	Volatile Suspended Solids	10.000	mg/L	4	6.000	35.900	16.425	1	4.500	L
9	Aluminum	30.000	ug/L	156	10.000	3330.000	817.885	1	1600.0	
9	Cadmium	2.000	ug/L	156	1.000	25.000	3.256	1	4.700	
9	Copper	10.000	ug/L	156	10.000	50.000	12.756	1	15.000	
9	Lead	30.000	ug/L	156	10.000	210.000	53.590	1	67.000	
9	Molybdenum	20.000	ug/L	156	20.000	80.000	24.167	1	0.500	L
9	Zinc	10.000	ug/L	156	10.000	3390.000	893.397	1	1200.0	
12	Mercury	0.100	ug/L	12	0.100	0.200	0.108	1	0.020	L
14	Phenolics (4AAP)	2.000	ug/L	360	2.000	1090.000	223.836	1	318.000	
17	Benzene	0.500	ug/L	11	0.100	1.000	0.464	1	0.200	
17	Toluene	0.500	ug/L	11	0.060	1.000	0.409	1	0.800	
19	Benzobutylphthalate	0.600	ug/L	12	0.600	4.400	1.683	1	1.000	
19	Bis(2-ethylhexyl)phthalate	2.200	ug/L	12	1.500	5.700	2.475	1	3.000	
20	2,4-Dimethylphenol	7.300	ug/L	12	0.600	29.000	6.827	1	7.000	
24	Octachlorodibenzo-p-dioxin	0.030	ng/L	2	0.020	0.060	0.040			N
24	Octachlorodibenzofuran	0.030	ng/L	2	0.020	0.050	0.035			N
24	Total PCDF	0.015	ng/L	2	0.010	0.093	0.051			N
24	Total TCDF	0.015	ng/L	2	0.036	0.220	0.128			N
25	Oil and Grease	1.000	mg/L	156	1.000	25.000	2.196			N
27	PCBT	0.100	ug/L	12	0.020	0.120	0.074	1	0.020	
MC1	Iron	0.020	mg/L	156	0.020	2.020	0.599	1	1.500	
MC1	Magnesium	0.020	mg/L	156	0.090	13.700	9.161	1	7.800	
MC2	Fluoride	0.100	mg/L	156	0.100	17.000	4.506	1	4.800	

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

NI = NUMBER OF MOE INSPECTION OBSERVATIONS

LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions

MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT 0300 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	151	10.000	72.000	19.596	1	20.000	
2	Cyanide Total	0.005	mg/L	12	0.003	0.103	0.047	1	0.033	
3	Hydrogen Ion (pH)			354	3.800	7.900	6.421	1	7.610	
4a	Ammonia plus Ammonium	0.250	mg/L	12	0.020	0.820	0.535	1	0.550	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	0.890	1.580	1.220	1	1.000	
4b	Nitrate+Nitrite	0.250	mg/L	12	0.340	1.510	0.832	1	1.200	
5a	DOC	0.500	mg/L	50	0.900	8.100	3.834	1	4.400	
5b	TOC	5.000	mg/L	4	5.800	10.700	8.100	1	7.000	
7	Specific Conductance	5.000	uS/cm	354	120.000	429.000	302.209	1	364.000	
8	Total Suspended Solids	5.000	mg/L	354	1.000	188.000	18.655	1	25.500	
8	Volatile Suspended Solids	10.000	mg/L	4	6.000	36.600	16.165	1	4.600	L
9	Aluminum	30.000	ug/L	151	10.000	9050.000	1599.536	1	2100.0	
9	Cadmium	2.000	ug/L	151	1.000	31.000	7.020	1	9.400	
9	Copper	10.000	ug/L	151	10.000	140.000	19.735	1	25.000	
9	Lead	30.000	ug/L	151	10.000	460.000	130.000	1	170.000	
9	Zinc	10.000	ug/L	151	20.000	8850.000	2025.232	1	2400.0	
12	Mercury	0.100	ug/L	12	0.100	0.200	0.125	1	0.050	L
14	Phenolics (4AAP)	2.000	ug/L	349	2.000	1690.000	543.083	1	786.000	
17	Benzene	0.500	ug/L	11	0.100	2.000	1.073	1	1.800	
17	Styrene	0.500	ug/L	11	0.260	2.000	0.742			N
17	Toluene	0.500	ug/L	11	0.060	2.000	0.678	1	0.800	
19	1–Methylnaphthalene	3.200	ug/L	12	0.400	6.700	3.075	1	4.000	
19	2–Methylnaphthalene	2.200	ug/L	12	0.400	5.100	2.375	1	5.800	H
19	Benzobutylphthalate	0.600	ug/L	12	0.600	13.000	4.358	1	4.000	
19	Biphenyl	0.600	ug/L	12	0.600	1.100	0.733			N
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	1.500	12.600	3.625	1	5.000	
19	Di–n–butyl Phthalate	3.800	ug/L	12	1.100	7.800	4.250	1	8.800	H
19	Fluoranthene	0.400	ug/L	12	0.200	1.300	0.467	1	0.600	
19	Naphthalene	1.600	ug/L	50	0.500	5.800	1.994	1	5.200	
19	Phenanthrene	0.400	ug/L	50	0.400	4.300	1.620	1	1.000	

ATG = ANALYTICAL TEST GROUP

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MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT 0300 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
20	2,4–Dimethylphenol	7.300	ug/L	12	0.600	57.000	30.977	1	43.000	
20	Phenol	2.400	ug/L	12	0.600	1500.000	594.217	1	510.000	
20	m–Cresol	3.400	ug/L	12	0.800	31.000	18.025	1	11.600	
20	o–Cresol	3.700	ug/L	12	1.200	280.000	131.267	1	127.000	
20	p–Cresol	3.500	ug/L	12	1.100	65.000	35.342	1	17.000	
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	0.040	0.090	0.065			N
24	Octachlorodibenzofuran	0.030	ng/L	2	0.020	0.090	0.055			N
24	Total H6CDF	0.020	ng/L	2	0.010	0.020	0.015			N
24	Total TCDF	0.015	ng/L	2	0.045	0.094	0.070			N
25	Oil and Grease	1.000	mg/L	151	1.000	24.000	2.003	1	1.000	
27	PCBT	0.100	ug/L	12	0.020	0.270	0.123	1	0.020	
MC1	Iron	0.020	mg/L	151	0.020	3.080	1.169	1	1.900	
MC1	Magnesium	0.020	mg/L	151	5.400	14.300	9.373	1	8.100	
MC2	Fluoride	0.100	mg/L	151	0.100	35.000	8.268	1	9.600	

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

NI = NUMBER OF MOE INSPECTION OBSERVATIONS

LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions

MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA *

FORD MOTOR COMPANY OF CANADA, WINDSOR

CONTROL POINT 0500 – EMERGENCY OVERFLOW

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.
1	Chemical Oxygen Demand	10.000	mg/L	4	14.000	30.000	23.500
3	Hydrogen Ion (pH)			4	6.400	7.800	7.050
8	Total Suspended Solids	5.000	mg/L	4	6.000	56.000	19.250
14	Phenolics (4AAP)	2.000	ug/L	4	2.000	344.000	208.250
19	Phenanthrene	0.400	ug/L	4	0.400	0.700	0.475
25	Oil and Grease	1.000	mg/L	4	2.000	6.000	5.000
27	PCBT	0.100	ug/L	4	0.020	0.170	0.087
MC1	Iron	0.020	mg/L	4	0.670	4.210	2.177
MC1	Magnesium	0.020	mg/L	4	6.270	10.700	8.662
MC2	Fluoride	0.100	mg/L	4	0.200	9.200	4.425

ATG = ANALYTICAL TEST GROUP

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* Inspection not conducted at this control point

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

FRANKLIN ELECTRIC OF CANADA, STRATHROY

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	5	12.600	74.480	29.576	3	32.000	
3	Hydrogen Ion (pH)			14	7.470	8.210	7.723	3	9.180	H
4a	Ammonia plus Ammonium	0.250	mg/L	5	0.086	0.350	0.276	3	0.150	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	5	0.500	21.200	13.934	3	1.617	
4b	Nitrate+Nitrite	0.250	mg/L	5	1.130	3.110	1.768	3	0.600	L
5a	DOC	0.500	mg/L	14	17.210	97.940	67.140	3	4.900	L
5b	TOC	5.000	mg/L	5	18.660	99.700	61.414	3	10.000	L
6	Total Phosphorus	0.100	mg/L	5	0.050	1.550	0.422	3	0.273	
7	Specific Conductance	5.000	uS/cm	5	643.000	837.000	738.800	3	698.333	
8	Total Suspended Solids	5.000	mg/L	14	5.000	77.600	19.343	3	39.400	
9	Aluminum	30.000	ug/L	14	30.000	650.000	158.571	3	1500.0	H
9	Cadmium	2.000	ug/L	14	1.000	29.000	5.243	3	0.200	L
9	Nickel	20.000	ug/L	14	10.000	130.000	30.714	3	3.333	L
9	Thallium	30.000	ug/L	14	20.000	110.000	35.714	2	30.000	
9	Vanadium	30.000	ug/L	14	20.000	70.000	28.571	3	1.867	L
9	Zinc	10.000	ug/L	14	10.000	84.000	27.429	3	4.000	L
11	Chromium (hexavalent)	10.000	ug/L	14	3.000	105.700	23.242			N
25	Oil and Grease	1.000	mg/L	14	1.000	5.200	1.821	2	2.000	
26	Abietic Acid	0.005	mg/L	5	0.005	0.038	0.023	2	0.005	
MC1	Iron	0.020	mg/L	14	0.060	0.970	0.243	3	0.850	
MC1	Magnesium	0.020	mg/L	14	49.600	79.000	60.719	3	49.667	
MC2	Fluoride	0.100	mg/L	5	0.500	0.610	0.538	3	0.867	H

ATG = ANALYTICAL TEST GROUP

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LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions

MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

GENERAL MOTORS OF CANADA, ST. CATHARINES

CONTROL POINT 0900 – PROCESS EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	153	3.000	97.000	18.634	1	20.000	
2	Cyanide Total	0.005	mg/L	12	0.003	0.024	0.007	1	0.015	
3	Hydrogen Ion (pH)			342	7.500	8.950	7.980	1	7.870	
4a	Ammonia plus Ammonium	0.250	mg/L	12	0.214	2.020	1.069	1	1.150	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	1.510	3.440	2.035	1	1.650	
4b	Nitrate+Nitrite	0.250	mg/L	10	0.200	0.680	0.461	1	0.800	H
5a	DOC	0.500	mg/L	51	0.800	15.000	3.212	1	2.700	
7	Specific Conductance	5.000	uS/cm	339	260.000	3195.000	358.776	1	376.000	
8	Total Suspended Solids	5.000	mg/L	344	1.000	98.000	8.863	1	18.000	
9	Aluminum	30.000	ug/L	153	0.590	4180.000	660.216	1	670.000	
9	Cadmium	2.000	ug/L	153	1.100	79.000	2.675	1	1.700	
9	Chromium	20.000	ug/L	154	1.000	474.000	27.781	1	1.000	
9	Lead	30.000	ug/L	153	0.020	495.000	55.706	1	72.000	
9	Zinc	10.000	ug/L	153	0.139	2990.000	661.180	1	1600.0	
14	Phenolics (4AAP)	2.000	ug/L	343	0.014	800.000	77.690	1	128.000	
16	Chloroform	0.700	ug/L	12	0.400	1.900	0.858	1	0.200	L
17	Benzene	0.500	ug/L	12	0.400	1.700	0.950	1	0.600	
17	Toluene	0.500	ug/L	12	0.500	1.300	0.675	1	0.600	
17	m–Xylene and p–Xylene	1.100	ug/L	12	1.000	10.500	1.925	1	0.500	L
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	1.500	21.900	4.883	1	3.000	
20	2,4–Dimethylphenol	7.300	ug/L	12	1.100	99.100	21.017	1	2.000	
20	Phenol	2.400	ug/L	12	0.900	27.200	5.992	1	0.800	L
20	m–Cresol	3.400	ug/L	12	0.800	34.800	6.333	1	0.200	L
20	o–Cresol	3.700	ug/L	12	0.700	140.000	29.483	1	0.200	L
20	p–Cresol	3.500	ug/L	12	0.800	34.900	6.350	1	0.200	L
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	0.010	0.040	0.025			N
25	Oil and Grease	1.000	mg/L	151	1.000	6.000	1.428			N
26	Abietic Acid	0.005	mg/L	12	0.003	0.010	0.007			N
26	Levopimaric Acid	0.005	mg/L	12	0.005	0.010	0.008			N
26	Neoabietic Acid	0.005	mg/L	12	0.005	0.010	0.009			N
MC1	Iron	0.020	mg/L	153	0.030	4.980	0.728	1	1.000	
MC1	Magnesium	0.020	mg/L	153	0.370	15.800	9.124	1	8.400	
MC2	Fluoride	0.100	mg/L	12	0.140	0.490	0.279	1	0.240	

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MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

GENERAL MOTORS OF CANADA, ST. CATHARINES

CONTROL POINT 01000 – COMBINED EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	52	7.000	51.000	19.173	1	14.000	
2	Cyanide Total	0.005	mg/L	12	0.001	0.008	0.005	1	0.010	H
3	Hydrogen Ion (pH)			151	7.410	8.460	7.959	1	7.890	
4a	Ammonia plus Ammonium	0.250	mg/L	12	0.107	0.900	0.560	1	0.700	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	1.270	2.530	1.627	1	1.150	L
4b	Nitrate+Nitrite	0.250	mg/L	3	0.200	0.610	0.403	1	0.800	H
5a	DOC	0.500	mg/L	52	0.400	8.800	3.033	1	2.400	
6	Total Phosphorus	0.100	mg/L	52	0.003	0.900	0.082	1	0.080	
7	Specific Conductance	5.000	uS/cm	151	236.000	443.000	350.199	1	398.000	
8	Total Suspended Solids	5.000	mg/L	152	2.000	561.000	13.625	1	9.500	
9	Aluminum	30.000	ug/L	52	130.000	5330.000	537.500	1	400.000	
9	Cadmium	2.000	ug/L	52	1.100	6.000	1.852	1	0.800	L
9	Chromium	20.000	ug/L	52	1.000	138.000	16.190	1	1.000	
9	Lead	30.000	ug/L	52	10.000	360.000	29.154	1	26.000	
9	Zinc	10.000	ug/L	52	34.600	3410.000	386.685	1	730.000	
14	Phenolics (4AAP)	2.000	ug/L	152	1.000	400.000	50.943	1	169.000	
16	Chloroform	0.700	ug/L	4	0.700	1.000	0.800	1	0.800	
25	Oil and Grease	1.000	mg/L	152	1.000	12.000	1.751			N
26	Abietic Acid	0.005	mg/L	4	0.005	0.010	0.007			N
26	Levopimaric Acid	0.005	mg/L	4	0.005	0.010	0.009			N
26	Neoabietic Acid	0.005	mg/L	4	0.005	0.010	0.009			N
MC1	Iron	0.020	mg/L	52	0.100	7.640	0.665	1	0.510	
MC1	Magnesium	0.020	mg/L	52	3.840	19.000	9.524	1	9.400	
MC2	Fluoride	0.100	mg/L	4	0.180	0.260	0.217	1	0.180	

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MOE = MINISTRY OF THE ENVIRONMENT

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0100 – COMBINED EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	155	12.000	1460.000	216.676	1	234.000	
3	Hydrogen Ion (pH)			254	6.690	9.390	7.784	1	8.070	
4a	Ammonia plus Ammonium	0.250	mg/L	155	0.220	32.610	5.331	1	2.750	
5a	DOC	0.500	mg/L	53	7.120	76.000	16.028			N
6	Total Phosphorus	0.100	mg/L	52	0.100	10.000	2.019	1	2.200	
8	Total Suspended Solids	5.000	mg/L	253	1.000	2026.000	93.279	1	139.000	
16	1,1–Dichloroethane	0.800	ug/L	4	0.200	5.900	2.050	1	6.000	H
16	Methylene Chloride	1.300	ug/L	4	0.200	16.000	8.775	1	0.500	
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	4	10.600	43.000	26.075	1	1.000	L
20	4–Nitrophenol	1.400	ug/L	4	5.000	5.000	5.000	1	0.500	L
20	Pentachlorophenol	1.300	ug/L	4	2.000	2.100	2.025	1	0.200	L
20	Phenol	2.400	ug/L	4	0.330	17.000	6.432	1	0.200	L
25	Oil and Grease	1.000	mg/L	154	0.300	29.500	1.380	1	1.000	

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MOE = MINISTRY OF THE ENVIRONMENT
R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0200 – PROCESS EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	158	28.000	1312.000	404.203	1	346.000	
2	Cyanide Total	0.005	mg/L	12	0.289	2.000	1.011	1	0.005	L
3	Hydrogen Ion (pH)			363	6.700	12.560	9.098	1	8.650	
4a	Ammonia plus Ammonium	0.250	mg/L	158	0.220	96.500	32.167	1	30.500	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	2	8.670	49.350	29.010	1	39.400	
4b	Nitrate+Nitrite	0.250	mg/L	52	0.023	146.000	28.574	1	4.800	
5a	DOC	0.500	mg/L	52	8.900	124.000	36.119	1	40.000	
5b	TOC	5.000	mg/L	2	26.520	32.000	29.260	1	78.000	H
6	Total Phosphorus	0.100	mg/L	51	0.100	52.000	1.991	1	1.200	
7	Specific Conductance	5.000	uS/cm	356	172.000	20664.000	3569.758	1	3290.0	
8	Total Suspended Solids	5.000	mg/L	361	3.000	2496.000	307.407	1	151.000	
9	Aluminum	30.000	ug/L	155	100.000	25360.000	2163.632	1	1300.0	
9	Beryllium	10.000	ug/L	155	1.000	50.000	9.226	1	0.300	L
9	Cadmium	2.000	ug/L	155	1.800	38.000	5.902	1	5.500	
9	Chromium	20.000	ug/L	155	20.000	6640.000	850.548	1	570.000	
9	Cobalt	20.000	ug/L	155	2.000	130.000	43.406	1	8.500	
9	Copper	10.000	ug/L	155	9.000	4600.000	624.768	1	420.000	
9	Lead	30.000	ug/L	155	15.000	400.000	63.935	1	54.000	
9	Molybdenum	20.000	ug/L	154	18.000	140.000	27.831	1	11.000	L
9	Nickel	20.000	ug/L	155	20.000	870.000	49.677	1	26.000	
9	Silver	30.000	ug/L	155	10.000	1930.000	395.265	1	390.000	
9	Vanadium	30.000	ug/L	155	20.000	660.000	64.129	1	7.700	L
9	Zinc	10.000	ug/L	155	30.000	12710.000	845.903	1	440.000	
10	Antimony	5.000	ug/L	2	50.000	278.000	164.000	1	1.000	L
10	Arsenic	5.000	ug/L	2	50.000	522.000	286.000	1	1.000	L
10	Selenium	5.000	ug/L	2	50.000	151.000	100.500	1	1.000	L
12	Mercury	0.100	ug/L	11	0.100	21.200	4.791	1	0.020	L
14	Phenolics (4AAP)	2.000	ug/L	360	2.000	570.000	44.343	1	67.000	
16	1,1–Dichloroethane	0.800	ug/L	12	0.200	2.900	0.900	1	1.000	
16	Methylene Chloride	1.300	ug/L	12	0.200	27.000	4.793	1	0.500	
17	o–Xylene	0.500	ug/L	12	0.200	1.200	0.392	1	1.000	
19	Bis(2–ethylhexyl)phthalate	2.200	ug/L	12	0.400	18.000	7.500	1	1.000	

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0200 – PROCESS EFFLUENT (FINAL)

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
20	4–Nitrophenol	1.400	ug/L	12	1.400	5.000	4.700	1	0.500	L
20	Pentachlorophenol	1.300	ug/L	12	1.300	4.800	2.292	1	0.200	L
23	1,2,3–Trichlorobenzene	0.010	ug/L	4	0.010	0.025	0.017	1	0.001	L
24	Octachlorodibenzo–p–dioxin	0.030	ng/L	2	0.220	1.000	0.610			N
24	Total H6CDD	0.030	ng/L	2	0.020	0.041	0.030			N
24	Total H6CDF	0.020	ng/L	2	0.020	0.072	0.046			N
24	Total H7CDD	0.030	ng/L	2	0.025	0.133	0.079			N
24	Total H7CDF	0.030	ng/L	2	0.025	0.041	0.033			N
24	Total PCDF	0.015	ng/L	2	0.015	0.019	0.017			N
24	Total TCDF	0.015	ng/L	2	0.010	0.015	0.013			N
25	Oil and Grease	1.000	mg/L	156	0.100	11.100	1.578	1	4.000	
26	Abietic Acid	0.005	mg/L	11	0.015	0.020	0.016	1	0.005	L
26	Chlorodehydroabietic Acid	0.005	mg/L	12	0.015	0.023	0.017	1	0.005	L
26	Dehydroabietic Acid	0.005	mg/L	12	0.015	0.038	0.022	1	0.005	L
26	Isopimaric Acid	0.005	mg/L	12	0.015	0.022	0.017	1	0.005	L
26	Levopimaric Acid	0.005	mg/L	12	0.015	0.022	0.017	1	0.005	L
26	Neoabietic Acid	0.005	mg/L	12	0.015	0.038	0.020	1	0.005	L
26	Pimaric Acid	0.005	mg/L	12	0.015	0.022	0.016	1	0.005	L
26	Oleic Acid	0.005	mg/L	12	0.015	0.110	0.032	1	0.019	
MC1	Iron	0.020	mg/L	155	0.160	26190.000	408.455	1	6.800	
MC1	Magnesium	0.020	mg/L	155	0.270	80110.000	3259.098	1	46.000	
MC2	Fluoride	0.100	mg/L	155	0.580	116.000	30.234	1	31.600	

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MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA *

HALEY INDUSTRIES LTD., HALEY

CONTROL POINT 0300 – STORM WATER EFFLUENT

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.
1	Chemical Oxygen Demand	10.000	mg/L	12	28.000	453.000	92.833
2	Cyanide Total	0.005	mg/L	12	0.004	4.530	0.387
4a	Ammonia plus Ammonium	0.250	mg/L	12	0.200	253.000	24.364
4b	Nitrate+Nitrite	0.250	mg/L	12	0.650	11.800	2.337
5a	DOC	0.500	mg/L	12	2.100	34.650	7.787
6	Total Phosphorus	0.100	mg/L	12	0.090	0.380	0.137
8	Total Suspended Solids	5.000	mg/L	12	8.000	806.000	178.917
9	Aluminum	30.000	ug/L	12	30.000	10210.000	1650.000
9	Beryllium	10.000	ug/L	12	3.000	53.000	9.750
9	Chromium	20.000	ug/L	12	20.000	100.000	31.667
9	Cobalt	20.000	ug/L	12	20.000	90.000	35.000
9	Copper	10.000	ug/L	12	9.000	70.000	21.417
9	Lead	30.000	ug/L	12	15.000	150.000	44.583
9	Vanadium	30.000	ug/L	12	30.000	310.000	61.667
9	Zinc	10.000	ug/L	12	9.000	860.000	307.000
14	Phenolics (4AAP)	2.000	ug/L	12	0.024	283.000	43.100
25	Oil and Grease	1.000	mg/L	12	0.500	1.000	0.917
MC1	Iron	0.020	mg/L	12	0.290	1770.000	150.344
MC1	Magnesium	0.020	mg/L	12	6.780	401.900	49.967
MC2	Fluoride	0.100	mg/L	12	0.030	37.000	8.972

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* Inspection not conducted at this control point

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

KUBOTA METAL, FAHRAMET DIV., ORILLIA

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
1	Chemical Oxygen Demand	10.000	mg/L	4	9.000	71.000	32.750	1	20.000	
2	Cyanide Total	0.005	mg/L	4	0.005	0.012	0.009	1	0.001	L
3	Hydrogen Ion (pH)			12	7.930	8.540	8.167	1	8.210	
4a	Ammonia plus Ammonium	0.250	mg/L	4	0.680	2.300	1.370	1	1.700	
4a	Total Kjeldahl Nitrogen	0.500	mg/L	4	1.120	3.080	1.898	1	2.400	
4b	Nitrate+Nitrite	0.250	mg/L	4	0.500	0.780	0.673	1	0.450	L
5a	DOC	0.500	mg/L	12	1.000	8.800	5.194	1	4.100	
5b	TOC	5.000	mg/L	4	3.900	14.400	7.800	1	4.000	
6	Total Phosphorus	0.100	mg/L	4	0.030	0.140	0.098	1	0.020	L
7	Specific Conductance	5.000	uS/cm	4	370.000	411.000	395.250	1	427.000	H
8	Total Suspended Solids	5.000	mg/L	12	17.000	35.000	25.667	1	19.300	
9	Aluminum	30.000	ug/L	12	40.000	2605.000	405.417	1	130.000	
9	Copper	10.000	ug/L	12	3.000	52.000	18.250	1	48.000	
9	Silver	30.000	ug/L	12	5.000	100.000	30.833	1	54.000	
9	Zinc	10.000	ug/L	12	4.000	65.000	16.417	1	20.000	
14	Phenolics (4AAP)	2.000	ug/L	12	2.000	25.500	6.958	1	14.800	
15	Sulphide	0.020	mg/L	4	0.020	0.160	0.057	1	0.006	L
16	Chloroform	0.700	ug/L	4	0.300	2.600	1.400	1	3.000	H
25	Oil and Grease	1.000	mg/L	12	1.000	12.600	3.033	1	1.000	
MC1	Iron	0.020	mg/L	12	0.030	0.586	0.168	1	0.081	
MC1	Magnesium	0.020	mg/L	12	7.800	10.700	9.023	1	8.600	
MC2	Fluoride	0.100	mg/L	12	0.100	0.280	0.158	1	0.220	

ATG = ANALYTICAL TEST GROUP

RMDL = REGULATION METHOD DETECTION LIMIT

N = NUMBER OF OBSERVATIONS

NI = NUMBER OF MOE INSPECTION OBSERVATIONS

LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions

MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

RICHMOND DIE CASTING LTD., CORNWALL

CONTROL POINT 0100 – COOLING WATER

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
3	Hydrogen Ion (pH)			12	7.300	8.560	8.107	1	8.230	
5a	DOC	0.500	mg/L	11	2.300	31.000	6.591	1	3.100	
8	Total Suspended Solids	5.000	mg/L	12	2.000	88.000	11.208	1	1.300	L
9	Aluminum	30.000	ug/L	12	20.000	180.000	79.667	1	50.000	
9	Zinc	10.000	ug/L	12	0.010	48.000	19.333	1	8.200	
11	Chromium (hexavalent)	10.000	ug/L	10	3.100	73.000	13.650			N
25	Oil and Grease	1.000	mg/L	12	1.000	11.000	2.750	1	1.000	
MC1	Iron	0.020	mg/L	12	0.030	0.270	0.099	1	0.051	
MC1	Magnesium	0.020	mg/L	12	0.025	9.800	7.827	1	7.000	
MC2	Fluoride	0.100	mg/L	12	0.070	0.200	0.132	1	0.120	

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METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

WESTERN FOUNDRY CO. LTD., WINGHAM

CONTROL POINT 0100 – COOLING WATER (ARTHUR STREET)

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION NI	MOE INSPECTION CONC.	R
3	Hydrogen Ion (pH)			11	7.500	8.400	7.864	1	8.300	
5a	DOC	0.500	mg/L	11	0.600	1.900	0.891	1	1.100	
8	Total Suspended Solids	5.000	mg/L	11	3.600	5.000	4.182	1	12.500	H
9	Aluminum	30.000	ug/L	12	18.000	271.000	71.208	1	720.000	H
9	Copper	10.000	ug/L	12	3.800	19.000	9.117	1	4.500	
9	Zinc	10.000	ug/L	12	3.500	225.000	43.108	1	45.000	
14	Phenolics (4AAP)	2.000	ug/L	11	0.800	15.000	6.855	1	2.600	
25	Oil and Grease	1.000	mg/L	10	0.230	5.200	2.233	1	1.000	
MC1	Iron	0.020	mg/L	12	0.103	0.760	0.270	1	0.530	
MC1	Magnesium	0.020	mg/L	12	18.700	30.500	24.124	1	25.000	
MC2	Fluoride	0.100	mg/L	11	0.720	1.150	0.920	1	0.880	

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LTA = LONG TERM AVERAGE CONCENTRATION – See chapter 4.4 for definitions

MOE = MINISTRY OF THE ENVIRONMENT

R = REMARK: L = BELOW MIN/MAX RANGE, H = ABOVE MIN/MAX RANGE, N = NO INSPECTION DATA

METAL CASTING SECTOR

12 MONTH DATABASE – 01 MAY 1990 TO 30 APRIL 1991

MONITORING AND INSPECTION DATA

WESTERN FOUNDRY CO. LTD., WINGHAM

CONTROL POINT 0200 – COOLING WATER (CNR BRIDGE)

ATG	PARAMETER	RMDL	UNITS	N	MINIMUM CONC.	MAXIMUM CONC.	LTA CONC.	MOE INSPECTION		R
								NI	CONC.	
3	Hydrogen Ion (pH)			12	7.300	8.400	7.808	1	8.330	
5a	DOC	0.500	mg/L	11	0.500	2.700	1.218	1	0.700	
8	Total Suspended Solids	5.000	mg/L	11	3.600	16.000	6.527	1	1.400	L
9	Aluminum	30.000	ug/L	12	8.000	1,240.000	182.833	1	360.000	
9	Copper	10.000	ug/L	12	3.000	28.000	10.083	1	11.000	
9	Zinc	10.000	ug/L	12	6.500	107.000	41.200	1	11.000	
14	Phenolics (4AAP)	2.000	ug/L	11	0.800	25.600	6.164	1	7.600	
25	Oil and Grease	1.000	mg/L	10	0.230	39.400	5.469	1	1.000	
MC1	Iron	0.020	mg/L	12	0.076	3.997	0.727	1	0.190	
MC1	Magnesium	0.020	mg/L	12	12.920	29.050	22.450	1	25.000	
MC2	Fluoride	0.100	mg/L	11	0.560	1.050	0.888	1	0.940	

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GLOSSARY OF TERMS

GLOSSARY OF TERMS

ATG	Analytical Test Group as listed in schedule 3 of the General Regulation
Backwash	The operation of cleaning a filter or column by reversing the flow of liquid through it, thus washing out matter previously trapped.
BAT	Best Available Technology
BATEA	Best Available Technology Economically Achievable
Blank	A preliminary analysis omitting only the sample to provide an unbiased reference point or baseline for comparison.
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand - a measure of the dissolved oxygen used by microorganisms in biological oxidation of organic matter under specified conditions for a specified time.
BPJ	Best Professional Judgement
Characterization	The analysis of a sample to identify and quantify all of the parameters in the schedule, except those in analytical test groups 28a, 28b and 29.
COD	Chemical Oxygen Demand - the amount of oxygen needed to completely oxidize all oxidizable organic and inorganic substances in water.
C of A	Certificate of Approvals
Combined effluent	Effluent resulting from the intentional combination of process effluent with cooling water

GLOSSARY OF TERMS (continued)

Corrected data	Data that have been corrected for laboratory method blank analyses.
Cupola	A vertical shaft furnace consisting of a cylindrical steel shell lined with refractories and equipped with air inlets at the base and an opening near the top for charging fuel and melting stock.
D	Daily
Die Casting	A casting process where molten metal is forced under high pressure into the cavity of a metal mold.
Direct Discharger	Any point source that discharges to a surface water.
DL	See MDL
DOC	Dissolved Organic Carbon
Duplicate sample	One of two samples collected at a sampling point, at the same time, in a manner that minimizes differences between the samples.
Effluent	The output or discharge from a water treatment process or from a point source.
EMPPL	Effluent Monitoring Priority Pollutants List
Filtration	Removal of suspended matter by passing it through a porous matrix that prevents particles from getting through, usually by entrapment on or in the filter matrix.
FPI	Fluorescent Penetrant Inspection (at Haley)
H6CDD	Hexachlorodibenzo-p-dioxins
H7CDD	Heptachlorodibenzo-p-dioxins
H6CDF	Hexachlorodibenzofurans
H7CDF	Heptachlorodibenzofurans
IDL	Industrial Discharge Limits

GLOSSARY OF TERMS
(continued)

Indirect Discharger	Any point source that discharges to a publicaly owned treatment works.
Initial Report	A report required by a Sectoral Effluent Monitoring Regulation before the monitoring of the effluent started
Inspection Sample	A sample collected by a provincial officer from a sampling point of a direct discharger
JTC	Joint Technical Committee
LC50	Lethal Concentration; the toxicant concentration killing 50% of exposed organisms at a specific time of observation.
LMDL	Laboratory Method Detection Limit
LTA	Long Term Average
M	Monthly
MDL or DL	Analytical Method Detection Limits - the minimum concentration of a parameter necessary to infer its presence in a sample with a level of confidence greater than 99 per cent.
Metals	A large group of elements in the periodic table, some of which are essential nutrients, and some of which may be toxic to living organisms.
Micro	Prefix meaning one millionth, as in microgram, micrometer. One microgram per litre is equal to parts-per-billion (ppb).
MIDES	MISA Data Entry System
Milli	Prefix meaning thousandths, as in millilitre, milligram. One milligram per litre is equal to parts-per-million (ppm).
MISA	Municipal/Industrial Strategy for Abatement
MOE	Ministry of the Environment

GLOSSARY OF TERMS
(continued)

Mold	A form made of sand, metal or refractory material that contains the cavity into which molten metal is poured to produce a casting of definite shape and outline.
Nano	A prefix meaning billionth, as in nanogram, nanosecond. One nanogram per litre is equal to one part-per-trillion (ppt).
Nano	A prefix meaning billionth, as in nanogram, nanosecond. One nanogram per litre is equal to one part-per-trillion (ppt).
O8CDD	Octachlorodibenzo-p-dioxin
O8CDF	Octachlorodibenzofuran
ODWO	Ontario Drinking Water Objectives
O&G	Oil and Grease
Open Characterization	The analysis of a sample to identify and determine the approximate quality of all the parameters in analytical test groups 28a, 28b and 29.
PCBT	Total Polychlorinated Biphenyls
PCDF	Pentachlorodibenzofurans
pico	A prefix meaning one trillionth as in picogram.
ppb	See Micro
ppm	See Milli
ppt	See Nano
PWQG	Provincial Water Quality Guideline; the best available value used to assess potential aquatic environmental impacts.

GLOSSARY OF TERMS
(continued)

PWQO	Provincial Water Quality Objective; a numerical or narrative limit recommended to protect all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure and to protect recreational water uses.
Q	Quarterly
QA/QC	Quality Assurance/Quality Control
RMDL	Regulation Method Detection Limit or Analytical Method Detection Limit listed in schedule 3 of the General Regulation. The RMDL is the maximum allowable value for a LMDL.
RMH	Rotary Multiple Hanging Unit (at Haley)
SA	Semi annually
SIS	Sampling Information System
Slag	A product resulting from the action of a flux on the oxidized non-metallic constituents of molten metals.
TCDF	Tetrachlorodibenzofurans
TOC	Total Organic Carbon - a measure of the organic contaminants in a wastewater. The TOC analysis does not measure as much of the organics as the COD or BOD rests, but it is much quicker than these tests.
Toxicity	A quantitative assessment of the capacity of a toxic agent to kill or cause harm; may include acute toxicity (short term) and chronic toxicity (long term exposure or action).
Toxicity test	The means to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of response of an exposed test organism to a specific chemical or effluent.

GLOSSARY OF TERMS
(continued)

Travelling blank	A sample of uncontaminated water that accompanies the container intended for the other sample to the area in which the other sample is to be collected. The sample of water is opened and resealed in that area and is returned to the laboratory together with the other effluent sample.
Travelling spiked blank	A sample of uncontaminated water to which a standard solution has been added. The sample with this solution accompanies the container intended for the other sample to the area in which the other sample is to be collected. The sample spiked with solution is left unopened and is returned to the laboratory together with the other effluent sample.
TSS	Total Suspended Solids - Undissolved solids that can be removed by filtration.
TW	Thrice weekly
Uncorrected data	Data that have not been corrected for laboratory method blank analyses.
W	Weekly
WRB	Water Resources Branch
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant